COMMODORE

COMPUTING INTERNATIONAL

APRIL 1985

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But not content to rest on our laurels, U.S. Gold has negotiated exclusive coding rights for U.K. machines and

LL OF THE ADVENTURE,
ERS, ALL OF THE TIME!

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The one magazine every
Commodore owner needs

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COMPUTING
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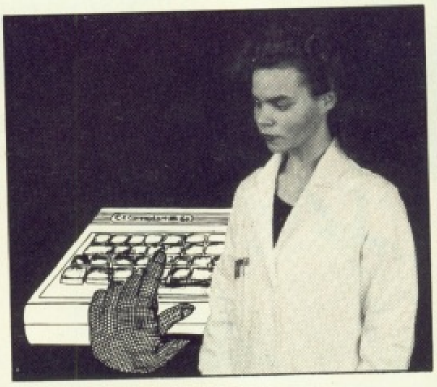

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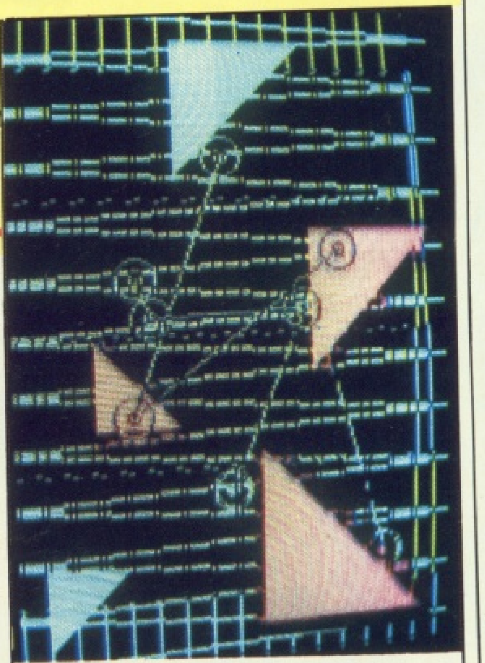

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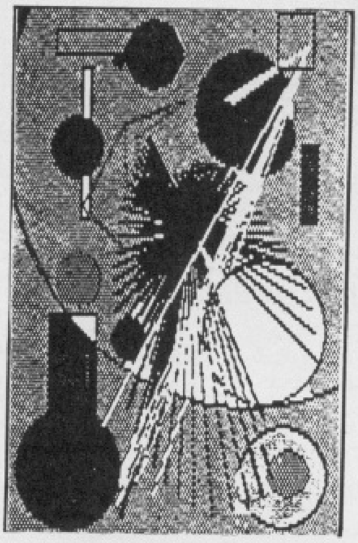

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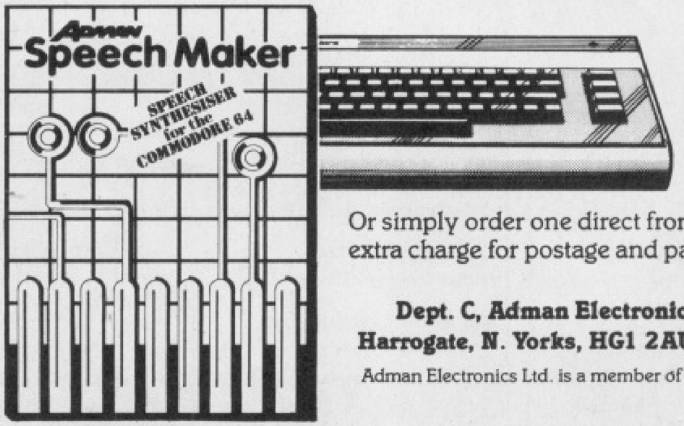
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ADMAN ELECTRONICS

Comment...

Dear Reader,

It's Happy Birthday to you and it's Happy Birthday to us...

This is the third anniversary of CCI. The first full coverage Commodore magazine was launched with the April 1982 issue. And we are proud to have some faithful readers since the beginning.

Three years... Many computers and computer magazines have come and gone — this month two more departed including the general games magazine Big K. Yes, things have changed and will go on changing rapidly. The Sinclair ups and many downs ... the rises and disastrous falls of Acorn and Oric (see the news page) ... and the growing international strength of the most successful 'small' computer manufacturer, Commodore.

CCI has also changed but never failing to lead the field with ideas and innovations; always, we hope, interesting and useful. We, at CCI, do not believe a serious computer magazine has to be dull in content and style. We believe you are interested in a wide variety of relevant news, reviews, features and programs in a lively but easy-to-read design.

Many of you treat games as a significant part of the use of a Commodore. So, in this issue, we have a major feature on Adventure, an increasingly important games sector. Adventure games are perhaps more demanding of logic and intellectual curiosity and are, if anything, more addictive than most arcade games. Finding the rusty key to the creaking door and getting the flashing sword to cut through the cobwebs to where the distressed maiden awaits has given most of us midnight shadows under the eyes more than once. Yet successful adventure players may not be necessarily more intelligent but simply more adept of guessing the pattern of the games setters' minds. Real individual creativity is not yet always a vital ingredient.

Nevertheless, adventure games are opening up a new and interesting dimension of home computer use, especially with interactive books and MUD style combinations, certainly bringing a greater sophistication to the games world.

Three years ago, adventure games were hardly thought of, nor was Artificial Intelligence also covered in this issue — and graphics another of our features are leaping forward into exciting developments.

Changes of content, changes of style ... but the Commodore world goes on growing and so does CCI. Anyone care to predict what the magazine will be featuring in April 1988?

Antony H. Jacobson
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...news...news

CBM's no to price cuts doesn't stick

Commodore (UK) vehemently crushed any thoughts that it might join a home computer pricing war less than a week before slashing the price of its brand new Plus/4 by £150, from £299.99 to £149.99.

The price war started with Sinclair's 28 percent cut on its Spectrum Plus machine. That was followed less than a day later by Acorn's 35 percent reduction on the Electron.

The next day, Commodore's UK General Manager Howard Stanworth said in a statement that the company "has no plans to reduce the price of any of its home computers."

But the dramatic slice off the Plus/4 a week later may not be a contradiction. The Spectrum Plus and Electron are generally considered in the league of Commodore's 64, the price of which remains the same.

"It is not unusual for us to do this," says Stanworth, citing the price cut last summer on the 64. "The 64 originally sold for £345 plus VAT when it first came out, but as our volumes increased and our ability to produce the machine increased, we found we could make it for less."

The result was a reduction in price to £299 "overnight" last June. "It's something we can do once we've gone through the learning curve of production."

The Plus/4, which Commodore began manufacturing at Corby last September, got a cool reception from most in the industry even before it was officially launched late last year and the lack of software for it compared to the 64 makes the new machine much less desirable to many consumers.

One distributor, for example, says sales of the business-oriented Plus/4 are "not very good." He has sold only two since Christmas compared to about 100 64s. The new price for the Plus/4, which still comes with integral word processor, database, spreadsheet and graphics package, brings it £50 below the cost of a 64.

Stanworth, however, says plenty of software already exists for the machine. "There's no great problem where that is concerned," Stanworth says. In fact, Commodore are negotiating "a major deal which I can't name" for an addition to the line. He says it will be an adventure rather than a business-oriented program.

And sales have "fully met our expectations to date," he said noting, however, that those expectations were buffered by the knowledge that the machine would only be available in limited quantities at first.

Meanwhile...

At press time, the personal computer industry was watching carefully the happenings in and around Acorn Computers after the company announced on 6 February that share trading would be suspended as of that afternoon.

Soon after, Acorn announced that it was taking steps to reorganise the troubled firm. The same statement revealed that, five days earlier, the company had changed financial advisors and received notice of resignation from its brokers.

The share price had dipped to a drastically low 25p per share on the day of suspension but rallied back up to 28p before the board of directors announed its decision to stop trading on the Stock Exchange. The share price had peaked last year at 193p per share.

The British home computer market is valued at more than £500 million a year, and Acorn claimed after Christmas that its piece of the market had increased over the holiday period from 10 percent to 25 percent.

Prism goes to receiver

A receiver appointed by the former board of directors for Prism Group is working to dispose of the company's assets and sell the various businesses involved in Prism Group.

A statement issued on 29 January read, "Expressing its regret at announcing the decision, the board stated that due to a shortfall in contribution from its principal activities and write-downs in the value of software and modems stock, the group was unable to support its current trade and the new ventures upon which it had embarked during 1985."

Prism Group includes Prism Micro Products, Wren Computers Ltd and ECC Publications. A large part of PMP's business was distributing products for Sinclair Research, but Sinclair cancelled its agreement with Prism about the time Prism went into receivership. Sinclair has since said it will co-operate with the receiver, Stephen Adamson of the accounting firm Arthur Young McClelland Moores & Co, to continue supplying products while Adamson is negotiating the sale of Prism.

Rumours about cashflow problems at Prism cropped up several weeks before the company went into receivership, but officials seemed confident the problems would be sorted out.

A viewdata system made up of the Prism Modem 1000 and plug-in software cartridge was one of the latest packages emerging from the Prism Micro Products division. The product's manufacturer, OE Ltd of Penrith, says the Telemod 2 modem was renamed specifically for the Prism package and is still available from OEL. The combination of modem and software retails for £129.95, the same price Prism was charging for its package. The product now allows access to electronic mail services such as Telecom Gold in addition to the previously available Prestel and Micronet servies.

Contact: OE Ltd, North Point, Gilwilly Industrial Estate, Penrith, Cumbria CA11 9BN. Tel: 0768 66748.

Software to aid Ethiopia

Bob Geldof has given his blessing to the computer industry's answer to "Feed the World" by allowing the Band Aid song to be included on a cassette compilation of games from leading companies.

Of the three tapes to be produced, one will be for the C64. The retail price will be £2.99. Among the 10 games to be included on each tape are titles for A&F Software, Activision, New Generation, Quicksilva, Virgin, Llamasoft, Bug-Byte, Beyond, Silversoft, Ultimate, Ocean, Micromega, Software Projects and Fantasy.

The project is being organised by Rod Cousens of Quicksilva and Computer Trade Weekly. The tapes, which will be longer than average computer games cassettes, will be distributed by Microdealer UK.

The official project launch was scheduled for the Leisure Electronics Show in late February.

Show boasts big names

British Telecom, CASE and Ferranti are among the major concerns on the roster for The Northern Computer Show to be held in Manchester April 16-18.

From 60 to 70 firms will be aiming at a market of businesses now using computers or considering bringing computers into the office.

Among the exhibitors will be Computer Terminal Services, Institute of Small Business and Great Northern Computer Services.

Contact: Exhibition Manager, The Northern Computer Show, Reed Exhibitions, Surrey House, 1 Throwley Way, Surron, Surrey SM1 4QQ. Tel: 01-643-8040.

114 jobs eliminated

CBM has axed 114 jobs in its sixth month as a working plant in Corby. The company announced in early February that the workers would be laid off due to the unexpectedly steep seasonal decline in the market.

"The home computer market has always been highly seasonal," Stanworth said. "This year the seasonal trend has been even more pronounced than usual."

The 114 workers released had been hired as permanent staff. In addition, Commodore let go any temporary staff hired for the peak holiday season. The work force remains at more than 6000 employees, though, and a spokesman stressed that the number still is more than the original employment target for this stage.

Commodore gave no indication about whether the job cuts came in any particular area of the 230,000 square foot plant which is now producing about 2,000 computers every week.

Meanwhile, the international company is still planning production of its own IBM-compatible PC which will be manufactured in West Germany along with other Commodore business machines. CBM recently announced that Northamber PLC, a computer peripherals distributor, has been contracted to be the main distributor of the Commodore PC.

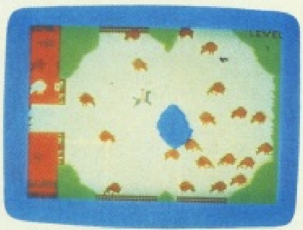
Northamber will begin its work for Commodore by distributing the 8000 series computer of which the 8296D is the newest. It will pick up with the PC when it is launched later this year.

Commodore also has appointed John Baxter, formerly marketing manager of Commodore UK, as the second addition to the new European management team. The new division was set up to lead the business systems push. Baxter's role will be International Marketing Manager looking after new product development. The first appointee, announced some months ago, was Gail Wellington.

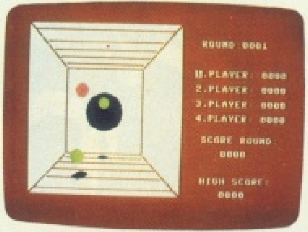
Observation...

There must have been a wry smile on the faces of many of those returning from the January Which Computer? Show when they discovered that Digital Research had developed an operating system for another processor which will enable the running of IBM PC software. Other well known companies are understood to be working on it with a view to producing more advanced IBM PC-lookalikes. The question is when will they announce the results of their work? If the announcement of new advanced IBM PC-lookalikes happened to coincide with the launch of the Commodore PC, an interesting situation might develop!

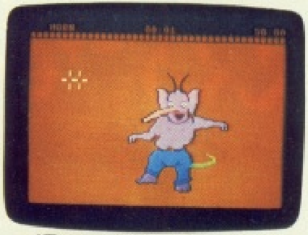
DRIVE A HARD SOFT BARGAIN.



'Buffalo Round Up'



'Spatial Billiards'



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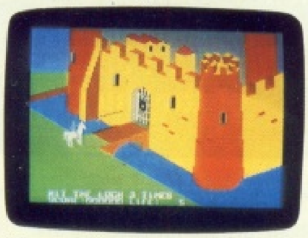
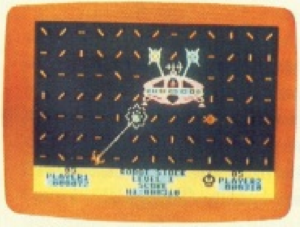


'Save Me Brave Knight



'Photon Reflection'

It's not every day you get offered a bargain as good as this: five games in one package for just £9.99.

And not just any old games, but really outstanding, exciting and unusual ones.

No other games collection comes anywhere near the 'Fantasy Five.' Each game is unique and demands very different talents of the player.

In 'Buffalo Round Up' you can see how you'd have made out as a wrangler in the Wild West. You have to be both skilful and fast to corral the buffalo before they stampede off into the desert.

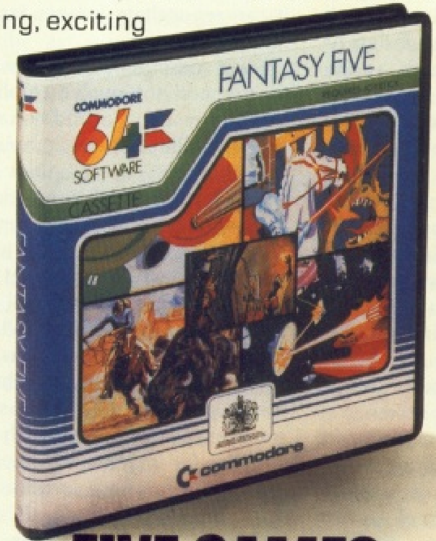
Then you can test your skills in three unique variations of the traditional game of billiards, with 'Spatial Billiards.' It's billiards in 3-D in a gravity-free room!

In 'Dancing Monster' a wicked wizard has cast a spell on a beautiful princess. To stop his evil, you have to shoot off his horns, eyes, nose, ears and so on while he continues to dance. Defeat the monster, and you'll be astonished by his transformation into...?

Then you can don your shining armour and rescue your true love from her evil captors' castle. 'Save Me Brave Knight' is full of evil monsters and fire-breathing dragons, and is exceptional in its graphic style.

If that sounds a little down-to-earth, how about 'Photon Reflection,' where aliens make the final assault on your galaxy. As the Supreme Commander you must capture their Mother Ship. It's a strategically demanding game with a unique laser-shooting sequence using reflectors. Tricky!

The unique design of all these games means they will make the very most of your Commodore 64's capabilities. They're available on either cassette or disk.



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Computer art has come a
'Mickey Mouse' origins. Geoffr
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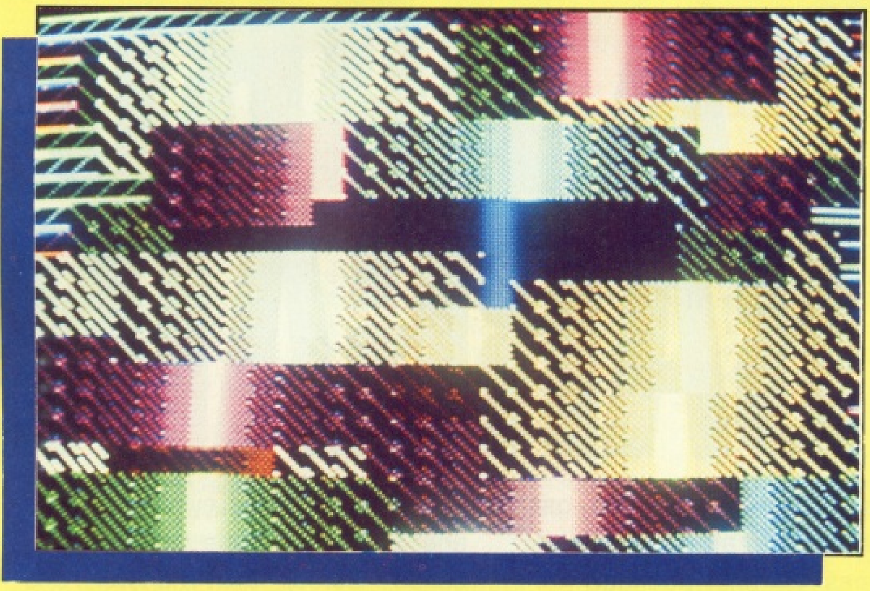
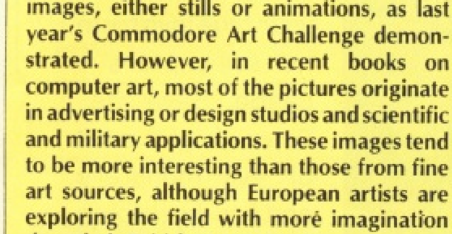


Graphics by Geoff Davis

The involvement of the computer or microprocessor in professional imaging processes is now so widespread it is difficult to separate computer 'art' from design or graphics. Low price micros, such as the Commodore 64, can produce spectacular images, either stills or animations, as last year's Commodore Art Challenge demonstrated. However, in recent books on computer art, most of the pictures originate in advertising or design studios and scientific and military applications. These images tend to be more interesting than those from fine art sources, although European artists are exploring the field with more imagination than their British counterparts.

If all video processing, computer design and 'paintbox' techniques (user driven graphics) are included, then computer art would appear to be just strange images produced on a television monitor or graphics plotter. It is seen as an extension of normal graphics techniques rather than anything radically new. So an enormous number of clever images miraculously appear, all fine in their own right, but stifling the possibilities of other forms of computer art.



If this is all it's about, then the Channel Four title sequences and various advertisements would be the high point, since they are visually impressive and a cause for congratulation all around. These images are undoubtedly superior to those produced by a home micro, and this illustrates a point: the computer is conceptualised as a sort of regurgitating camera. Obviously an expensive mini is better than a cheap micro, since it can regurgitate images faster and more realistically.

But a computer is not a camera — computer art need not involve graphics at all. This bias is a result of a traditional approach to the possibilities of the computer and 'camera thinking' by graphics professionals whose job is, after all, producing two dimensional images. The search for the mundane — pictures of objects that are so detailed they look just like the real thing — has become the modus operandi of the computer art industry. This is all well and good, but means that computers such as the VIC 20 are seen as useless artistically when in fact they are, in principle, exactly the same device as more expensive models with the same possibilities for imaginative use.

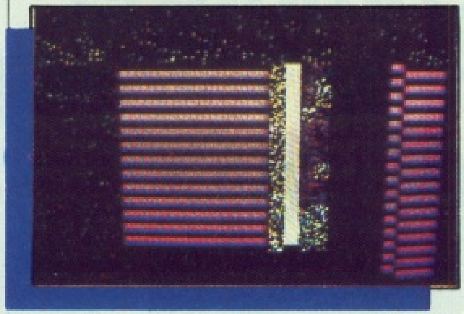
Recent years have seen the software market expand to include all sorts of utility programs to increase the graphics and sound capacities of the micro. The most recent innovation has been the appearance of art products — collections of animated images and art events — on the Micro Arts label. These developments show the evolution of the software market from the early crude games through to the present very sophisticated utilities, games and art products.

However, the explosion of paintbox software has diverted attention away from other possibilities in computer art. Most people using these software packages are hardly aware of the bizarre and incredibly complicated data processing that is going on under their fingers — yet this interaction between person and machine is more fundamentally 'computer art' than the usually tedious and banal images that the paintbox software lets them draw on the screen. This point aside, from a purely visual perspective, better and more unusual images can be produced by directly programming the machine. However, this takes more thought and a certain level of programming skill. It would seem that paintbox techniques and the importance of visual computer applications have diverted computer art away from any excitingly new areas.

The amazing flexibility of the computer has still to be properly exploited artistically. Visual output has become the publically accepted face of computer art. This as a lot to do with how easy it is to generate images on a computer, and the current lack of cheap sensor devices and cybernetics. A new form of interactive art will arise once these sensors (for light and therefore shapes, heat, pressure, etc) together with mechanical attachments — all programmable — are mass marketed. These could be allied with holographic projects to escape the horrible smallness of the VDU.

All this presents problems for those who classify art. Computer art started with simple plotted designs, such as Mickey Mouse or Marilyn Monroe run out on the office printer. (These seemed the most common, probably because of easily distinguished features.)

It soon progressed to images of almost photographic realism that can be animated in real time. The best graphic labs — such as Digital Productions of Los Angeles or the University of London — use Cray Supercom-



E ZLING AWN of uter art

ome a long way since its Geoffrey Davis, editor of com- icro Arts, traces the roots of ts that the graphic capabilities yet to be fully exploited

puters that can perform 100,000,000 calculations per second, obviously helpful with graphics algorithims. These images — whether generated by Cray or Commodore — would appear to be identifiable with past art history.

It was assumed that the innovators would eventually see their work accepted into the canons of Fine Art. However, there are problems based in the essence of computer production. The person making the image does not rely on traditional concepts of work and skill, both fundamental to the idea of a classical artist who would spend years, even decades, in intense training, Rather, that person would depend on imagination, creativity and self-critical assessment immediately, without having any training other than that needed to be familiar with the keyboard — or graphics pad — and the appropriate software. Of course this can and does lead to the tedious and banal images mentioned earlier, but that's another matter. Even the graphics programmer dealing with the programming language and screen control commands, does not quite fit the 'classical' mould since the skills involved are abstract, located on the border of heuristic problem solving (the logic of discovery and invention) and the techniques of artificial intelligence.

As this renders classicism irrelevant, the typical art critic or journalist finds difficulty integrating the work into serious Art. Even Modernism, in its many forms depends on the old values, if only in reaction to them as the cause of the collapse of traditional art in human history. Therefore computer art seems alien and phoney, even if the image is a bowl of fruit.

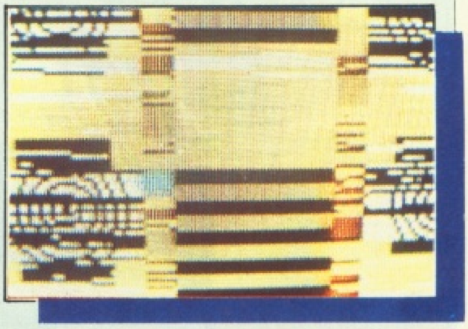
In this respect computer art is something even more radical than video or holographic artforms, both of which are still treated with suspicion by the art world. Even bigger headaches arise for the critic once the art machine is linked to music, linguistics or movement.

In that case,the data is processed and output as sound or cybernetic action. This is the world of the techno-primitives, possibly cultureless, amusing themselves with the new technology and inadvertently laying traps for the art critics.

If this is the case, and all this is so new and foreign to ideas about the classical Artist, it is probably not worth defining it as 'art' at all. Now that these strange, sophisticated machines are within reach of the average budget, the labeling becomes less important.

Economic factors — the price of the micro — cause a boom in computer art activity, bringing it into the world of leisure, where anything goes and nobody takes anything very seriously. This inevitable process moves art from its mystical position among the elite to the more accessible realms of entertainment.

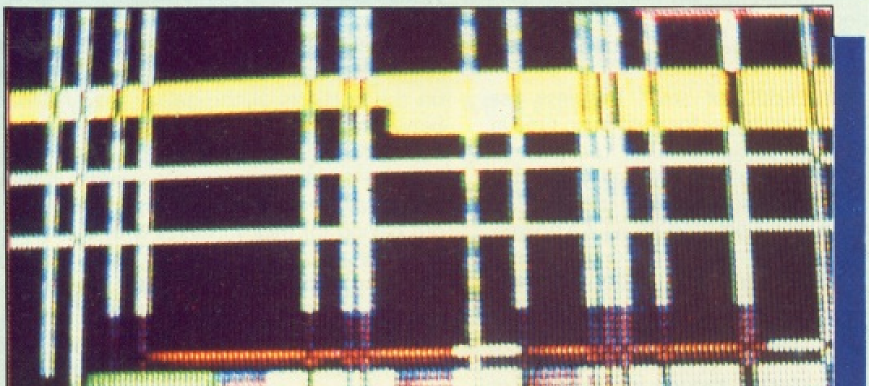
Some see computer art — along with video and music — as a way of reversing power within the mass media society. This is possible since hierarchies become less dominant once people start doing things for themselves. Perhaps all this is just a result of people buying stimulating artefacts like records, videos and, now, computers.



The power structures remain much the same, if not actually strengthened, during this period of supermarket culture. The computer is the first of these consumer products that demands some interaction other than passive acceptance — a reason why there are few 'star' programmers or computer personalities.

Computer art now stands in a similar position to that of photography or film when they first appeared — scorned, ignored or misunderstood, by the arts establishment, but increasingly popular among people who wouldn't care to define what they do as 'art' or themselves as 'artists'.

With photography and film, a small number of people reacted by taking hold of the new media and experimenting as widely, and wildly, as possible. This has yet to happen with computer art, as people are still constrained by out of date ideas of what art should look like, rather than exploring the peculiar capacities of that least predictable of tools, the micro.



Photography by Simon Holland

Choosing the right computer is a good start — but can you find the right software?

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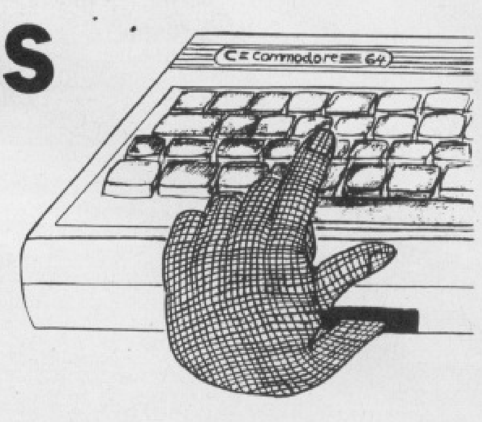
AI: the intelligent world of Expert Systems



Continuing our regular focus on the different areas of AI, Anthony Maxel explores the field of Expert Systems

"Well," says the Examiner, "The subject has a Commodore. Is well informed on computer matters. Aware of trends and new products. Imaginative and intelligent. Tell me is there any conclusion you can draw?"

"The data is limited," the Assistant replies. "However the subject almost certainly is a reader of Commodore Computing International magazine."

The conversation might not be so far away in time and only exceptional because the Assistant would not need to be human but could be a Fifth Generation computer using an expert system.

Expert systems may well be the best kept secret in computing. Their growing use is clouded under a mist of SF ideas about Artificial Intelligence enabling computers to threaten taking over the world. In fact, there are many expert systems, even in the present world of third generation computers, already in use and substantial development taking place to produce a wide range feasible for almost every professional activity.

An expert system is a computer program that has built into it the knowledge and capability that will allow it to operate at the standard of an expert; the performance level, for example, of a medical doctor or with the expertise required for engineering, scientific, professional or managerial tasks. An expert system is built to be able to present the lines of reasoning that led to its decision. Some can explain why they have rejected certain logical paths or solutions. 'Transparency', as this is called, is a major feature of expert systems.

Expert systems operate very well where the thinking is largely reasoning not calculating — which means most of the world's work. While a considerable amount of professional work seems to be expressed in mathematical formulae, what sets experts apart from beginners are symbolic and inferential concepts, based in experience. Human experts derive their expertise not only from text book knowledge, but from experience — getting a feel for a problem, learning when to go by the rules and when to break them. They build up a set of working approximations and ideas, 'rules of thumb', in technical terms 'Leuristics'. That combined with theoretical knowledge makes them 'experts'. Expert systems work in the same way. They are designed through the collaboration with already existing human experts and are intended to aid rather than replace the human mind.

USEFUL DEFINITIONS

Expert System — a computer program designed to perform very specialised and complex tasks of a professional or managerial nature at or beyond the level of an expert. Sometimes known as **Knowledge-based Systems**. May be regarded through their use of assisting a human expert as an Intelligent Assistant.

Heuristics — knowledge underlying expertise; the acquired ability to add skilled guessing to theoretical knowledge; wisdom and judgment derived from experience.

Knowledge Engineer — designer or builder of expert systems and other A.I. Systems necessary for Expert Systems. Enables previously unprogrammed 'inferences' to be drawn from Knowledge Base.

Knowledge Base — facts, assumptions, ideas, beliefs and heuristics — what is called in humans, 'expertise'. In an expert system many also define procedures for managing a data base to achieve required results.

Knowledge Information Processing Systems (KIPS) — The Fifth Generation of computers which will have the capacity to make inferential judgments. May be the first real exponents of Artificial Intelligence.

INTERNIST/CADACEUS

Perhaps the largest single group of expert systems presently in use is in medicine. The most knowledge-intensive example is INTERNIST/CADACEUS at the University of Pittsburgh. It carries out general medical diagnoses at a consultancy level. INTERNIST/CADACEUS covers more than 80% of all general medicine and its knowledge base comprises more than 500 diseases and over 3,500 manifestations of disease. Although the system was designed to aid skilled doctors in complicated problems, the program will probably also have many valuable uses as a diagnostic aid to medical assistants; in rural health clinics; or where there is urgency or isolation such as on the battlefield or in space travel.

MYCIN

Stanford University is a major centre for expert systems. MYCIN is one used for diagnosing blood infections. It acts as a consultant advising the doctor on treatment for the infection. If the doctor wishes, he can ask 'Why are you asking about this aspect?' Evolutions of MYCIN have shown it to be able to perform at the level of specialists of infectious diseases and above the level of non-specialist doctors.

MOLGEN

An expert system called MOLGEN — Molecular Genetics — advises on gene cloning and helps analyse DNA sequence data. It will take information on the aim of a gene cloning experiment and produce — including its reasons — plans for the steps necessary to achieve the goal. MOLGEN is being increasingly employed by academic and commercial genetic engineering laboratories.

DENDRAL

DENDRAL is another Stanford biological system which can analyse molecular structure from chemical data and perform at above general human capacity.

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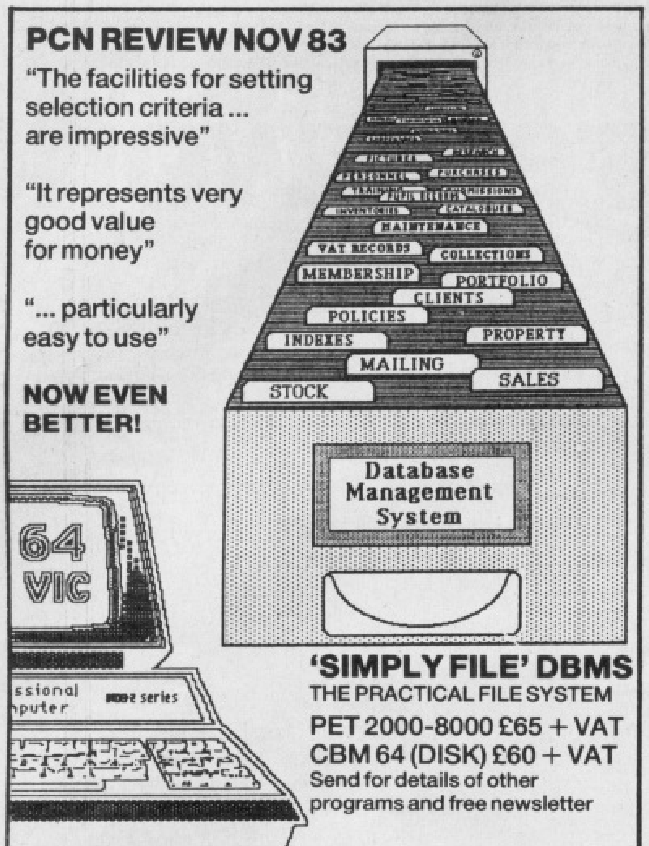

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HASP/SIAP

In the Defence business, expert systems are seen as cost-efficient and of growing importance. In US tests, HASP/SIAP, a passive sonar surveillance system, has been shown to perform at levels equal to or sometimes superior to human performance.

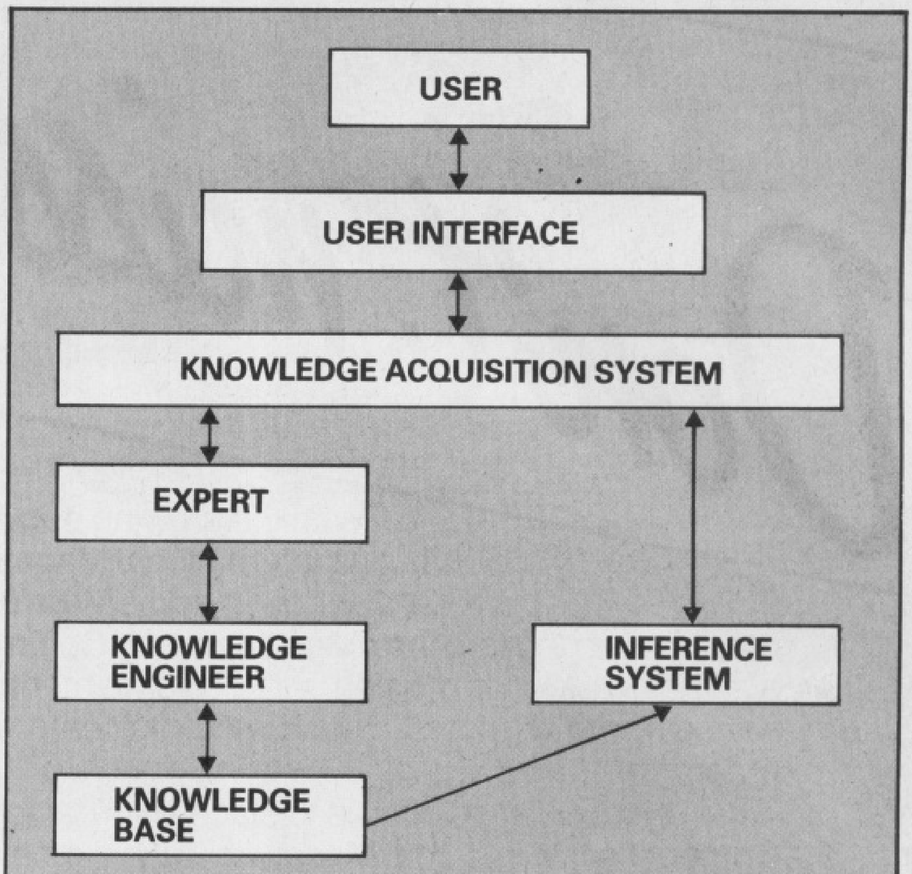
PROSPECTOR

PROSPECTOR is a system for advising during the process of field exploration for minerals — a field geologist's intelligent assistant. It recently enabled a find worth £100 million to be made on a site previously discarded as useless.

AL/X

AL/X is an expert system based on the useful idea that an expert can feed in his or her specialised knowledge and then allow the expert system to work on the expert's behalf. It is sold commercially for use in separate scientific areas which can be encoded and drawn upon in the scientific expert's absence.

In the US, Computer Company DEC are selling an expert system that assists salespeople to select appropriate computer systems. They say it does not only recommend their own machines! Interestingly, IBM has not yet released an expert system of their own, although they are known to be investing substantially in research in the field.



Expert systems — basic structure

Apart from the areas listed, there are also expert systems emerging in languages, education, robotics, manufacturing, financial planning, communications and, of course, computer systems. There are systems that assist structural engineers in identifying the best analysis strategy; a system for dealing with rules implicit in tax laws; another for assisting software construction and debugging, for transferring knowledge from human experts and guiding the acquisition of new inference rules; even an expert system that guides the development of expert systems.

These large and powerful expert systems are increasingly available and will be made much more general as the Fifth Generation of computers emerges. However with growing spread and power of the small PC style computers, it is possible to design expert systems on a commercial basis. It was recently suggested by Horace Mitchell of the UK expert system company, Business Information Techniques, that such commercial applications are very near.

Expert systems do offer an important advantage over conventional software program development. They put the building of programs directly into the hands of the person whose problem is being programmed — the experts. Expert systems move away from building a program by writing instructions toward describing the data a program will use, the appropriate association between data and the likely form of solution. The program instructions can be inferred by computers from this previous data. It became therefore for the computer not a mere mathematical process but one of reasoning. At the present, this approach to building programs is practicable only for relatively simple tasks but we shall see it spread rapidly in the second half of the 80's.

Expert systems are a part of the growing world of Artificial Intelligence. Already operating in academic and commercial environments, they are limited by the relatively low power of today's computers. However, the fifth generation is on the horizon. With that level of computer muscle at our disposal, KIPS — Knowledge Information Processing Systems — will make today's expert systems look puny and bring to greater reality the fast expanding world of artificial intelligence.

Anthony Maxel

Most people label the first four generations of computers, each based on its central technology, this way:

1. Electronic-vacuum tube computers
2. Transistorized computers
3. Integrated circuit computers
4. Very large-scale integrated computers (VLSI)

We are currently at the end of the third generation, and VLSI will dominate during the 1980s. The general design of all four is known as the von Neumann machine — after the computer pioneer and mathematician John von Neumann — and is composed of a central processor (a program controller), a memory, an arithmetic unit, and input-output devices. It operates in a largely serial fashion, step by step. It has served its purposes well. But the Fifth Generation will abandon it, or greatly modify it. Instead there will be new paralled architectures (collectively known as non-von Neumann architectures), new memory organisations, new programming languages, and new operations wired in for handling symbols and not just numbers.

The Fifth Generation will stand apart not only because of its technology, but also because it is conceptually and functionally different from the first four generations the world is familiar with.

The Fifth Generation*

Next Month: Our Artificial Intelligence Service covers the Fifth Generation and asks the pertinent question 'what do you mean Intelligent?'

*The Fifth Generation
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A splash of colour

Van Gogh look out! Sue Pearce finds out how easy it can be to create colourful and creative pictures with two graphics packages — Micro Illustrator and Tony Hart's Art Master, while Paul Jenkins provides an in-depth critique of White Lightning

MICRO ILLUSTRATOR

US Gold, the software house that has made a big impact in the games market, now looks set to muscle in on other areas of the software market. Micro Illustrator, one of their first offerings outside the games sector, is a well-chosen product for the company to begin with.

Available on disk for the 64, Micro Illustrator is light pen driven. About six inches in length, the light pen is made of a sturdy black plastic with a button near the tip to activate it. A cable of 36 inches enables comfortable movement.

After loading the program and inserting the light pen in port 1, you are confronted with a well laid-out menu. The top half of the screen is taken up with 15 commands with symbols illustrating their purpose: draw, paint, line, rays, fill, frame, box, circle, disc, erase, storage, mirror, magnify and align.

A section beneath that indicates the 10 different brush options available to you. And finally no less than 16 different colours to choose from — well, 32 actually as each colour is available as solid or as a finely dotted effect.

That should give you some idea of just how much you can do with Micro Illustrator.

The ease of use of this program is definitely a big plus. All you have to do is point the light pen at the feature you require and press the button on the light pen. You move from the menu to the picture simply by pressing the space bar.

At this point I must mention a minor gripe. That is the accuracy required in selecting a colour. The cursor indicating the position of the light pen on the screen is not always as responsive as you would like, sometimes resulting in two or three attempts to get the colour of your choice. However, this can be corrected using the align feature, which enables you to adjust your cursor to the light pen.

One of my favourite features is the interestingly-named rubber banding. This gives the immense advantage of being able to see a representation of your chosen operation before making it a part of your picture. Rubber banding is available when you select lines, rays, frames, boxes, circles and discs.

However, if you aren't happy with a certain move once it's been drawn in, there is still the option to erase last command, in addition to the ability to erase the whole picture.

And, if after several moves you change your mind about an earlier addition, you can always paint over it choosing the background colour.

Interesting results can be achieved in no time at all. Horizontal and vertical lines and circles are drawn well, although diagonal lines are broken. Using the magnify function will enable you to establish a degree of accuracy, but you will need an extremely steady hand when using the draw feature. When I tried to draw freehand using this feature, I found that the line wobbled all over the place. For example, when drawing the neck of the swan illustrated, I achieved better results by using a combination of lines.

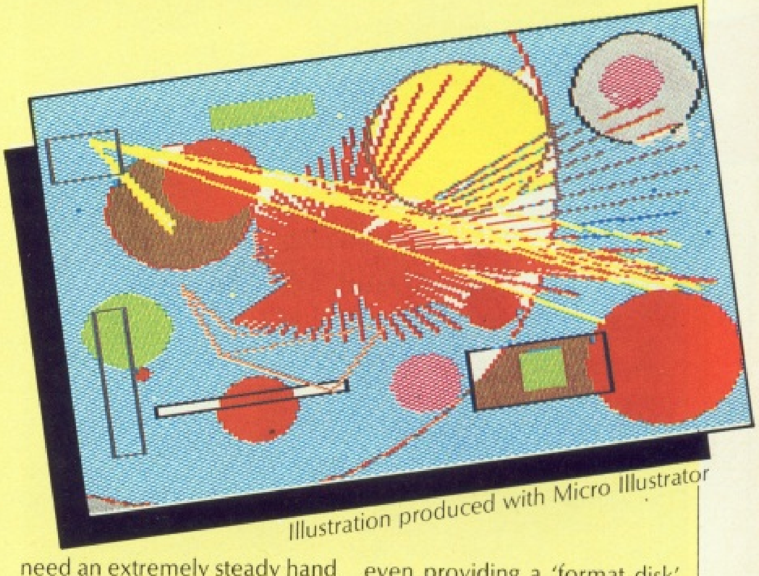
Illustration produced with Micro Illustrator

Selecting the storage feature allows you to save your creations onto disk (and to load any you may have saved). Here again, the program 'holds your hand' through the process, even providing a 'format disk' command. The storage menu also displays a list of any pictures saved.

In conclusion, at £29.95, Micro Illustrator is a comprehensive package which, combined with its extreme ease of use, would suit the purposes of even the least experienced artist — like myself!

Contact: US Gold, Unit 10, Parkway Industrial Estate, Heneage Street, Birmingham B7 4LT. Tel: 021-359 3020.

WHITE LIGHTNING

White Lightning, a games design system from Oasis may be aimed at those who have commercial software design in mind, but is equally suited to the hacker who wishes to transgress Basic, and get to grips with a serious programming language.

Its transformation from the Spectrum version has been implemented superbly, making full use of the C64's superior graphics and memory to add facilities Uncle Clive's baby couldn't handle. Although this review concerns the cassette version, it is also available on Disk.

White Lighting comes in a twin cassette folder, complete with two booklets containing around 180 pages of instructions and information — a really neat package indeed!

"On a par with the best"

One cassette (number 2) contains a basic extension called Basic Lightning. As extensions go, this one is on a par with the best. Adding 150 extra commands, it covers three main areas: structured programming, graphics, and sound. It also has a multi-tasking ability, allowing it to carry out up to five separate operations almost simultaneously. Some of the structured programming aids include: Procedures, multi-line If Then Else, Repeat Until, While Wend, and Case Of, to name but a few.

The graphics department has a lot to offer including: Plot, Draw, Poly (for polygons and circles!), and Box. Sprite commands are numerous and include facilities to move sprites (on and off screen), scroll or wrap screens and sprites, a window facility, rotate, mirror, flip over, exchange sprites and the usual collision detection.

Sound is equally well catered for with commands for Volume, Frequency, Music, Waveform, Filtering, Ring Modulation and Syncronisation.

Basic Lighting is designed to maintain compatibility with the commands and structure of the other Lighting languages. Therefore time spent developing routines, or even complete programs, in Basic Lightning is not wasted as conversion to the other languages is simplified.

The Sprite Generator Program is directly after Basic Lighting on number 2 cassette (the other side is exactly the same, except Turbo-loading). This little 20K gem is written entirely in Basic Lightning, and is intended to help the user design, test, and store sprites. It operates in five Modes, each mode playing a different role in sprite development.

Sprites can be designed in two colours (with control over individual pixels), or in four colours (with control over pairs of pixels). A high resolution window is displayed (this being the main testing area) enabling sprites to be positioned, removed, altered, repositioned, mirrored, flipped, expanded in either direction, etc. Alongside the window, an 8 character x 8 character grid is shown, representing 8 x 8 pixels, on which sprites are designed. They can be changed before or after placing in the hires window and colours can be altered at will. Series of sprite can be animated to form cartoon like movement — useful for moving figures on screen, or for explosions etc. Sprites may be up to six screens wide, enabling backgrounds to be scrolled (in both or either directions), although this does eat up the memory somewhat.

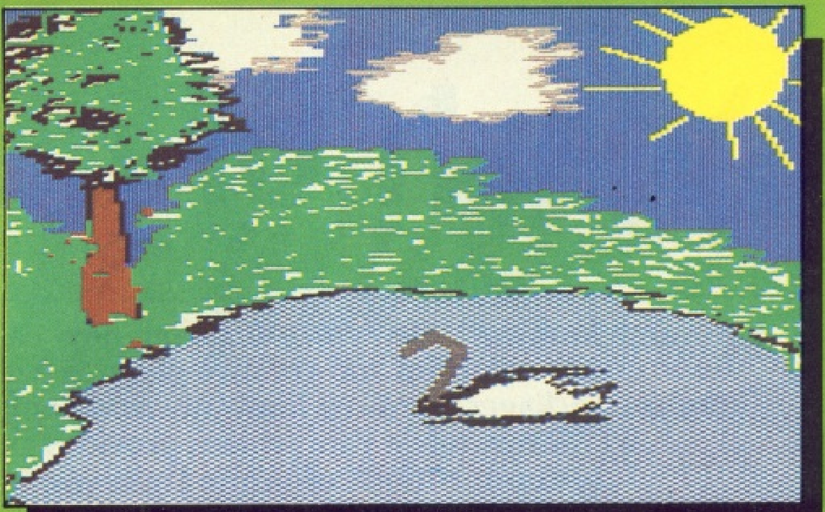

Illustration produced with Micro Illustrator

"Packed with facilities"

All things considered, this is one of the best Sprite Designers I've seen. It may seem a little tedious (due to the multi tasking every 1/20th of a second in some modes), but it is such a good performer, packed with facilities, that one can live with this. A library of Arcade and Demonstration Sprites are stored on tape, after the Sprite Generator. These may be loaded, altered, and resaved for your own use. Sprites can also be designed (and taken from the designer) as Data statements, meaning they may be used for Non-White Lightning programs. A nice feature of this system is that Sprites designed are portable between Basic Lightning and White Lightning.

Those of you who are content to dabble in Basic, using the Basic Lightning and Sprite Generator, will find endless enjoyment using these to design commercial type games — it really doesn't take long to get the hang of the new commands. However, to utilise this powerful package to its fullest, you'll need to use the White Lightning Forth/Ideal compiler.

FORTH IDEAL COMPILER

To obtain the speed and polish normally associated with commercial games, Oasis opted for Fig Forth as the host language for the system. Fig Forth is just a fraction slower (in execution) than Machine Code, but Forth/Ideal scores over Machine Code for a number of reasons. Firstly Forth is written using Mnemonics which makes programs easier to write and debug. It has certain routines built-in which save writing complex M/C routines. Forth programs also afford more crash protection that M/C (which has none!). White Lightning Forth/Ideal has almost 300 commands, access to Basic, and to Machine Code, if required.

"Forth/Ideal scores over Machine Code"

Oasis have assumed the White Lightning user to have an amount of Forth knowledge but if not they recommend several introductions to Forth. For the newcomer. This would be a good investment as, to be honest, the accompanying manual just isn't clearly enough written to help Forth beginners. However, the manual states that it is not intended as an introduction to Forth, so fair play to Oasis.

Using the White Lightning Forth/Ideal compiler then, is a whole different ballgame to Basic programming. A lot of patience, perserverance, and determination are involved in learning this language. I think the rewards more than justify the efforts as this certainly is a powerful and flexible package.

As this review is intented to be practical, I'll explain the basics of the White Lightning system (it would take up the whole magazine to go into details). On loading the other cassette (number 1), you are confronted with a white screen, a lime greed border, and dark blue text — White Lightning 64, V1.0, by Oasis Software. Code is entered in pages of 16 lines (numbered from 0 to 15). Before and after compiling (compile using the LOAD command), the lines may be edited using either the C64 screen editor or the Fig Forth editing commands.

The screen editor is easiest to use. Pages may be listed, as in Basic by 'n LIST' command, where 'n' is the page number, Code may be saved to cassette between sessions. Finally, when you are content with your masterpiece, the code is Zapped, using the ZAP command. This process removes the unnecessary source code, allowing the remaining program to run independently. Once this process is carried out your own program will load and run without White Lightning.

"The screen editor is easiest to use"

The graphics and sound commands (which you will mainly be using), are virtually identical to those of Basic Lightning. So again, the time spent learning

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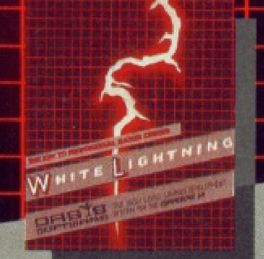
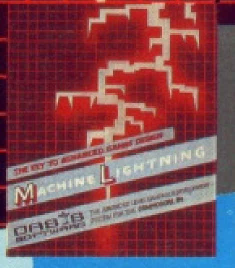




BASIC LIGHTNING

WHITE LIGHTNING

MACHINE LIGHTNING

LIGHTNING STRIKES AGAIN

OASIS SOFTWARE

THREE HIGH POWERED GRAPHICS DEVELOPMENT SYSTEMS FOR THE **COMMODORE 64.**

Totally dedicated to writing very fast, video games, BASIC Lightning is a is a fully structured extension to the Commodore BASIC which adds a staggering 200 reserved words. It allows up to five tasks to run concurrently (one in foreground and four in background). Most of the commands are dedicated to games writing and the sound and graphics commands are unparalleled. Procedures and PASCAL type structured programming commands are also a feature of BASIC Lightning.

As well as the Commodore's own 8 hardware sprites, BASIC Lightning has its own software sprites. Up to 255 can be defined with user selectable dimensions. These can even be several screens wide. They can be scrolled, spun, mirrored, enlarged or inverted with phenomenal speed and smoothness.

A Sprite Generator Program (written in BASIC Lightning) is also supplied and can be used to design, edit and store all your sprites for use in your main program.

White Lightning is a complete games writing package comprising a high level, Forth based, multi-tasking games writing language, the extended BASIC (see BASIC LIGHTNING) and a powerful sprite Generator Program. Programs can even be written in a combination of Forth and Commodore BASIC and the final program, which will run independently of White Lightning, can be marketed with no restrictions whatsoever.

The Basic Lightning part of the package can be used to experiment quickly and easily before the Forth program is developed.

The speed of White Lightning has to be seen to be believed and a full demo is included. As with Basic Lightning, hardware sprites are supported, together with 255 software sprites which can be scrolled, spun, reflected, enlarged or inverted.

MULTI-TASKING Without doubt the most powerful feature of the Lightning series of languages is the multi-tasking facility. This allows two programs to be run concurrently and makes those smooth landscape scrolls etc. effortless.

The BASIC Lightning Sprite Generator Program is also included in the package.

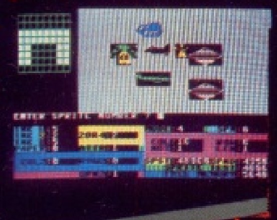
Commodore 64 Machine Lightning is probably the most advanced games writing utility available on any micro. It comes in 4 parts:

MACRO ASSEMBLER/ MONITOR/DISASSEMBLER This is probably the most comprehensive machine code development system available for the Commodore 64 with features too numerous to mention.

BASIC LIGHTNING BASIC Lightning, the multi-tasking BASIC is also provided to facilitate experimentation in preparation for later assembly.

SPRITE GENERATOR Used to develop all the graphics for the final game. The Sprite Generator has numerous functions including enlargement, rotation and reflection.

OBJECT LIBRARY This is Machine Lightning's most powerful feature. 10k of re-entrant code with more than 130 documented entry points. These are the routines that provide all the superfast graphics routines in White and Basic Lightning. They contain virtually every routine you'll ever need to write an Arcade Game and multi-tasking in Machine Lightning is covered in the comprehensive accompanying manual.



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these will not be wasted. (see Basic Lightning section for details). Any sprites designed with the Sprite Generator may be used within the Forth code.

Interrupts are the most powerful feature of the White Lightning system, and the Forth interrupts operate every $^1/_{60}$th of a second. This means that every $^1/_{60}$th of a second, the main program freezes, and several background tasks may be executed, before returning to the main program. Using this technique, backgrounds may be made to scroll in unison with foregrounds. Even diagonal scrolls are possible.

So White Lightning is a complete system for commercial games design — an advanced Basic with emphasis on structured programming, graphics, and sound; a powerful, feature packed Sprite Generator providing easily designed sprite characters and backgrounds; and an advanced Forth compiler, on which to transform you finished ideas into completed commercial quality programs.

"Excellent value for money"

A very comprehensive package indeed, hampered perhaps only by the user's knowledge of the Forth. As stated earlier though the Basic Lightning and Sprite Generator are super programs and excellent value for money (and with a Basic compiler on the way, this means your basic programs will run independent of Basic Lightning).

The only real complaint I found was in the inferior quality of the manuals.The information is all there (somewhere!), but the poor standards of writing make it inaccessible — a minor gripe considering the potential of this package.

If you are content to learn a sizeable new language, then White Lightning is an excellent system for developing commercial quality games software (which can be marketed without paying royalties). Even if you don't wish to learn Forth/Ideal, White Lightning still provides one of the best Basic Extensions and Sprite Generators available!

Contact: Oasis, 9A Alexandra Parade,
Weston-super-Mare, Avon BS23 1QT. Tel: 0934 419 921

TONY HART'S ART MASTER

At just £11.99, Tony Hart's Art Master from Commodore is at a price which may encourage parents to purchase it as a first graphics package for the kids — particularly as it is described as 'fun for all the family'.

However, many functions require a fair amount of thought and it's not possible to get straight into a work of art without carefully studying the eight-page manual.

only available in the block in which you set them. Therefore yyed in the detail box — you must set colours, available from keys F3, F5 and F7, for each block of the screen. A block is, eight vertical points by four horizontal blocks. These colours

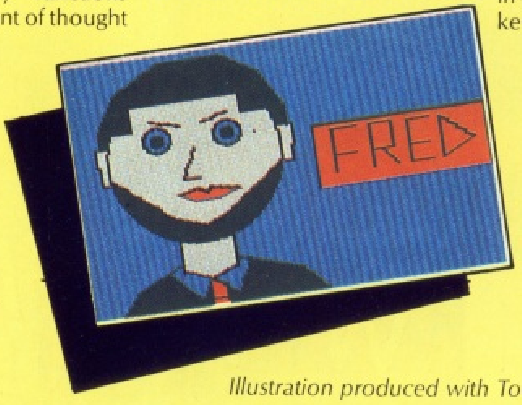

Illustration produced with Tony Hart's Art Master

"Many functions require a fair amount of thought"

The program is available on cassette for the 64 and can be operated with either a joystick or the keyboard. It comes with a second cassette displaying four pictures created with Tony Hart's Art Master — far more impressive than anything I was able to create (as you can see from the illustration here!).

The initial screen displays the detail box showing the three colours currently available to you, a magnification of the area you are working in, and a block to display messages. This box can be moved to three locations on the screen or removed completely.

Unless you want to stick to four basic colours (including background colour) — which are chosen when starting a new picture and displayed in the detail box — you must set colours, available from keys F3, F5 and F7, for each block of the screen. A block is eight vertical points by four horizontal blocks. These colours are then only available in the block in which you set them. Therefore you either need a pretty good idea of the content and dimensions of your chosen picture, or you keep re-setting blocks as you go along.

Straight lines and circles are reasonably satisfactory. On the subject of erasing, there is no 'erase last command' facility. However, pressing 'R' enables you to try out lines and circles before drawing them in. If you are unhappy with what you' have drawn, the answer is to redraw the shape in the background colour. Fine as long as you haven't already moved your cursor away from the starting point. If you only want to erase part of a shape you have to erase it one point at a time using the detail box to see where the target is in relation to the line. Yawn!

"Straight lines and circles are satisfactory"

One nice feature of this program is the ability to repeat blocks of graphics, either in different positions on the screen or in different pictures.

Another useful function is creating backup pictures. This enables you to work on two pictures at the same time or to store two copies in case one is accidentally erased.

Accidentally erasing a picture is quite possible if you don't pay close attention to which key you are pressing. For example, 'P' is the key for painting (filling in a closed shape) and 'O' is the key for overpainting (paint chosen overpaints everything except paint of the same colour). As O and P are situated next to each other on the keyboard, it only takes a slip of the finger to overpaint the majority of your picture!

"A slip of the finger can overpaint the majority of your picture"

Pictures can be stored on tape or disk. (You can then use your pictures as part of your own BASIC programs without losing any BASIC memory). Press T or D, as relevant, and the message save/load flashes up in the detail box. Press S or L and you will then be asked for the picture name. Another gripe here. There does not appear to be a facility provided in the program to list saved pictures. Therefore you must remember each name — write it down quickly — if you ever want to see it again.

I find it hard to recommend Tony Hart's Art Master. Admittedly if you persevere you can achieve good results, but there are other programs on the market that make your artistic life much easier.

Contact: Commodore (UK), 1 Hunters Lane, Weldon, Corby, N Hants. Tel: 0536-205555.

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Plus/4 gets Infocom adventures

A series of three adventures for the Plus/4 take the player through the "Underground Empire" in Zork I, Zork II and Zork III.

The designer is Infocom, the American software house that created many of Commodore's 64 adventure games. In Zork I, you must discover the Twenty Treasures of Zork and escape with them all the while avoiding perils and predicaments "ranging from the mystical to the macabre."

In Zork II, a character called the Wizard of Frobozz leads you further into the subterranean realm where he attempts to confound your quest with his capricious power.

The Dungeon master presents the "final test of your courage and wisdom" in Zork III.

Each game is available on disk for £11.99

Contact: Commodore UK, 1 Hunter's Lane, Weldon, Corby, N. Hants NN17 1QX. Tel: 0536 205252.

COMMODORE 16 GAMES BOOK by Cameron Duffy and Richard Woolcock — £5.95

This is an example of another type of book you can expect to see flood the market whenever a new computer reaches the shops — the book of programs. The programs in this book are relatively short and the games are what you'd expect — simple, not very spectacular but fun all the same. The programs are not fully explained but each routine in each program is preceeded by an explanatory REM in a box. With a few more explanatory notes it could have been a far better book.

There are two utility programs in the book, Merge and Chexsum. The first is self-explanatory and the second is a method of checking for errors in the program you've keyed in. It calculates a unique check-sum number for each line of the program and then prints out the line numbers followed by the checksum number. You then compare this with a similar table at the end of each program. It's a useful idea which should be copied.

Contact: Melbourne House, Castle Yard House, Castle Yard, Richmond, Surrey. Tel: 01-940 6064.

Pretty posies

There's a touch of chivalry in Roller Kong for the C16: the player gets extra points for collecting flowers to give to the damsel in distress.

The player's task is to rescue the maiden from her imprisonment before a deadly spider reaches her. The only way to get to her, though, is by climbing ladders and moving along platforms, all the while avoiding rolling barrels, fire bombs and "spinks."

Such a game was popular in arcade galleries some years ago.

The C16 version is £5.95 on cassette. Melbourne House says it will also be converting its adventures Wizard And The Princess and Classic Adventure for the C16.

Contact: Melbourne House, Castle Yard House, Castle Yard, Richmond, Surrey TW10 6TF. Tel: 01-940-6064.

Inevitable

It was a sure thing that the C16 would eventually get a "Defender"-style game for its ever-expanding repertoire and new company, Probe Software, have met the challenge.

Probe Software is nearly as new as C16, having released its first game in December for the C64. Called Alcatraz, the escape spree already has sold a couple of thousand copies, says company partner Fergus McGovern.

The company is now turning its eye toward the new market with Defence 16, a keyboard-controlled arcade game in the tradition of the popular Defender programs that have made their way to virtually every home computer at least in one form or another. Probe's version features smooth scrolling with high resolution graphics in simple but colourful art work.

Retailing at £7.99 for the cassette, Defence16 challenges the player to clear the planet of creepy little aliens such as landers and pods. As the game progresses through its 255 levels, the enemies get a bit more stubborn and certainly more accurate in their defense strategies. You also have the opportunity to use hyperspace and smart bombs — at your own risk of course. Programmer Vakis Paraskeva, previously a programmer for Romik Software, has added a fast loader called Vakload.

Contact: Probe Software, 74 Ribblesdale Road, London SW16 6SE. Tel: 01-769-2133.

Cuthbert comes to C16

A virtual cult hero on the Dragon machine and a hit on the C64, a character named Cuthbert now is hoping to steal the imaginations of C16 users as well.

Microdeal has released its complete "kit" of cassette, manual, maps and poster postcards for Cuthbert Enters the Tombs of Doom on Commodore's newest machine. The arcade adventure has Cuthbert as the hero who must overcome (or avoid if he can) such shady characters as a sadistic saxaphone and beastly bats to collect the required keys and treasure at the Temple of Ra.

Smooth horizontal scrolling and a chance to have tea with Cuthbert at Microdeal's headquarters are two of the perks designed to charm young players. To win the trip to Cornwall, you must create the best caption for a poster personally signed by Cuthbert, and all those who enter receive such a poster. Price of the game is £6.95.

Contact: Microdeal Ltd, 41 Truro Road, St Austell, Cornwall PL25 5JE. Tel: 0726-2456.

The Dommodire Kid
by Max
GRAPHICS PACKAGE
PAINT THE MONA LISA IN FIVE MINUTES
GULP!

Dear Editor...

Dear Editor

I would like to know when there is going to be more software for the C16 because the software I have mainly seen is for the 64 and VIC 20. So far I have only been able to get software from one shop in Oldham yet in other shops like WH Smiths and Boots they only sell software for the 64.

Master N Howard
Oldham
Lancs

Rae Potter of Commodore UK's software marketing department says C16 software should be available from Boots, WH Smiths and John Menzies retail outlets in addition to Greens' in Debenham. If the particular shops you've checked don't have what you are looking for, you should ask the dealer for a list of what is available on special order. And hot off the press from Ocean Software is an announcement that the highly popular Daley Thompson's Decathlon will soon be available on the C16 for £7.95. The projected release date is end of April.

Dear Editor:

I have recently decided to write a fast-loader program to increase loading speeds, but I have encountered a large problem, which is one I am unable to solve. This problem is because the Commodore 64 has so many interrupts, which must be turned off, but I cannot find out where they all are.

Please could you list the addresses of any such interrupts in the 64's memory.

M James
Burton-on-Trent
Staffordshire

Dream the impossible dream!!! There is no simple answer to your problem because, as you said, the 64 has SO MANY interrupts.

Considering the stage of programming you apparently are in, you would probably be wasting time trying to do something so complex on your own.

You don't mention whether you own a disk drive. If you do there are several companies selling programs to speed up disk loading:

MPS — Tel: 01-800 3592
Arrow — Tel: 01-303 8619
Evesham Micro — Tel: 0386 49641

Dear Editor:

I notice in your letters page of last month's edition that once again there is a cry from another VIC 20 owner that the magazine seems to cater mainly for the C64 and very little attention seems to be paid to the VIC 20 these days. I must say I agree with your correspondent, but the blame doesn't entirely rest on magazines as this trend also shows in software, in the main, and firms producing add-ons and new gadgets.

Commodore themselves are equally guilty of this, and most orders from their VICSOFT catalogue for VIC 20 items are met with a reply stating that these items are out of production.

I think it should be remembered that millions of people have bought a VIC 20, and have expanded them, bought expensive peripherals, and are quite happy with what they have and have no wish to change or upgrade to another computer. These millions are also potential customers for software, gadgets, add-ons — and magazine readers! To overlook such customers can only mean a loss of revenue to all concerned.

J Beech
West Wickham
Kent

CCI continues to run listings, news and reviews of VIC 20 software when it comes As for Commodore's VICSOFT department, it is always a good idea to call before ordering an item to see whether it is still stocked. The number is 0536-205252. One bright note is that prices of much VIC 20 software are dropping, so keep an eye out for bargains!

Dear Editor,

We would appreciate your mentioning the newly formed 'Christian Micro Users Association'. We hope to link a large number of Christian micro users and also to promote the use of micros in Church related activities.

There is a great need to discover the few individuals & companies producing 'Christian' software and to share the expertise and ideas of the many individuals who have sought to use micros within their church activities.

Anyone who would like further information can send a large SAE to:—

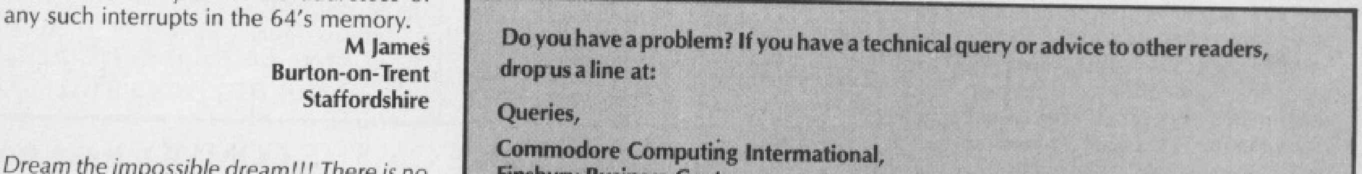
Christian Micro Users Association
6, Walkley Street,
Sheffield, S6 3RD.
P A Clark
(Secretary)
Sheffield

Do you have a problem? If you have a technical query or advice to other readers, drop us a line at:

Queries,

Commodore Computing International,
Finsbury Business Centre,
40 Bowling Green Lane,
London EC1R 0NE.

Please do not send your SAE's as it is impossible to reply personally to every query.


TIME FOR TEA!
PURR... FECT!

Book REVIEW

Computer journalist Peter Arnott-Job evaluates a selection of newly-released computer books.

GRAPHICS BOOK FOR THE COMMODORE 64 by Axel Plenge — £8.95.

This is probably the best book available about graphics on the 64 for general consumption. Even professionals who think in object code will find something of use in it. Outside textbooks and technical manuals, I've never seen the subject covered so exhaustively for any computer (not including those with little or no graphics capabilities, of course!).

Axel Plenge (the author is German) starts at the very beginning with a short discussion of decimal, binary and hex. Those who are already familiar with the fundamentals shouldn't worry too much because they are dealt with quickly and lucidly. In its 350 pages the book goes into a remarkable amount of detail — remarkable even for such a large book.

To make things as easy as possible the author has used BASIC wherever possible. Those dismayed at the slowness of the 64's BASIC, especially where graphics are concerned, will be relieved to discover that, where appropriate, Mr Plenge has provided alternatives in machine code or assembler.

The emphasis throughout is to make everything as clear as possible. Given the complexity of the 64's graphics this is itself no easy task. It is almost inevitable that a book which covers graphics so comprehensively will also teach the reader a great deal about programming in general and the 64 in particular.

In the circumstances it may seem petty to make a couple of relatively minor criticisms but a reviewer must have more to say than 'This book is excellent'! First of all something funny seems to have happened to the English language in translation. Since the book was originally published in West Germany I assume that it's been translated from German. That would explain the strange quality of the language. Fortunately it doesn't get in the way of the subject matter.

The second criticism is the old complaint — the binding. Although the binding is soft and you can lay the book flat without destroying it, spiral binding would have been better. While we're on the subject of keying in programs there's a warning in the front of the book that no part of the publication may be reproduced or stored in any sort of retrieval system. What's a computer's memory?

Contact: First Publishing, Unit 20B, Horseshoe Road, Horseshoe Industrial Estate, Pangbourne, Berkshire. Tel: 07357-5244.

THE COMMODORE 64 ADVENTURER by Bob Chappell — £3.95.

This is a book for cheats!

Well, not quite. As the author points out in his introduction there's nothing more frustrating than getting stuck in an adventure game and not being able to find a way out for weeks.

The Commodore 64 Adventurer offers 100 per cent solutions to four games: Heroes of Karn, Lords of Time, Voodoo Castle and The Count. There are explanations of every object and location. The explanations are good and they work. Where relevant you are referred to the entries for other objects and locations.

It's the sort of book that gives you an unnerving experience which leaves you wondering if your mind is really in charge of your body. You want to look up one entry but at all costs you want to avoid reading any other entry. But your eye fixes steadfastly on the very entry you don't want to read. The effort of stopping yourself reading is almost too much and by the time you've managed it, it's too late.

Bob Chappell has done his best to ensure that not too much of this happens. At the beginning of the section on each game there's an alphabetical list of objects and locations so you can turn straight to the right page without having to flick through the pages, running the risk of seeing something you'd rather not.

Even if you've solved a couple of the games you may still enjoy the book because it will point the way to all possible solutions. At the end of the day whether you're prepared to shell out £3.95 (a paltry sum for computer books these days) depends on how desperate you are, stuck there in that deep pit full of a slimy substance with only a piece of paper and an empty bottle...

Contact: Duckworth, The Old Piano Factory, 43 Gloucester Crescent, London NW1. Tel: 01-485-3484.

COMPUTE!'S FIRST BOOK OF THE COMMODORE 64: SOUND AND GRAPHICS — £10.95.

As if the title of the book wasn't long enough there's more: Tutorials, Utilities, Programs and other Helpful Information for the Owners and Users of the Commodore 64 Personal Computer. So much for the cover. But what more can a reviewer say when the information on the cover just about sums up what's inside the book? It almost reviews itself — but not quite.

The graphics section is very good but the sound section doesn't start until page 207. The text of the book (excluding appendices) finishes on page 249 so you can use your own judgment about the balance between sound and graphics. Having said that the sound part is every bit as good as the graphics part — it's just that there isn't as much of it.

Something like a quarter of the book has been published before in one of Compute!'s publications. But even if you have the original articles it should still be worth a perusal.

Commodore 64 Sound and Graphics is essentially a book of useful sound and graphics programs accompanied by helpful explanations. Thankfully the book is spiral bound which means that you can lay it flat to key in the programs without destroying the spine. The price tag of £10.95 seems slightly over the top and whether you're prepared to pay up will depend on how much you know already and how much more you want to know.

Contact: Holt Saunders, 1 St Anne's Road, Eastbourne, Sussex BN21 3UN. Tel: (0323) 638221.

ARTIFICIAL INTELLIGENCE ON THE COMMODORE 64 by Keith and Steven Brain — £6.95.

It's nonsense, of course trying to play Daley Thompson's Decathlon on an abacus. Clever (and some not-really-clever-at-all) tricks can make interacation between any computer and user look like intelligence on the part of the computer.

This book is really about programming simple expert systems on your Commodore 64 which at the end of the day, have nothing whatsoever to do with artificial intelligence. perhaps the authors and publishers are not to blame since the term artificial intelligence (AI) has been misused so much that it's almost interchangeable with the most prominent quality of computers — RS (Real Stupidity).

An expert system is a program that asks questions and makes choices. To use one of the examples the Brains use in the book (Just a minute! A book on artificial intelligence by the Brains?): a computer giving you advice on which computer you want to buy. The program asks you questions about the sort of computer you want and then, after comparing your replies with lists of specifications of a number of computers selects one or more which match your requirements. Artificial Intelligence on the Commodore 64 is an interesting little book for anyone who wants to know more about expert systems and the expert systems approach to AI.

It's a very practical book and would be very useful as a tutorial text. It would be ideal for anyone who's past the stage of games playing, is not attracted by programming for it's own sake and is showing signs of micro-disillusionment. Learning about expert systems with a book like this teaches you not just about programming but about ways of looking at problems. In spite of the title this is a good book — a useful introduction to the fascinating world of expert systems.

Contact: Sunshine Books, 12-13 Little Newport Street, London WC2R 3LD. Tel: 01-437-4343.

The Midas Touch

Software house US Gold would appear to be living up to its name in that all it touches seemingly turns to gold. Sue Pearce talks to joint director, Jeff Brown, about the company's success story as one of the first major importers of American software and the plans to broaden its horizons

Jeff Brown and his wife Anne set up distribution company Centresoft two years ago, originally importing software from America and selling it in the UK. Initial sales were not successful due to the high price of American software.

"At the beginning of 1983 I had a brainwave," says Brown. "I persuaded two American software houses — Datasoft and Cosmi — that to repackage and preprice for the UK market would be sensible."

Several months later, after selling an estimated half a million tapes, it all seems a simple solution. Brown explains: "They couldn't understand why the price had to be around £10. I had to re-educate them to understand the UK market."

Brown credits much of the company's success to the creation of a brand image — US Gold.

"Beach Head was foresight, not luck"

Beach Head has been one of US Gold's best sellers. "I had the foresight to pick up Beach Head," says Brown. "It wasn't luck. When we launched Beach Head it was an instant hit."

US Gold followed this hit with the release of another 35 programs of which, Brown claims, only three or four could be classed as 'just average'.

As a licensing company, US Gold then proceeded to license more American software with new labels appearing such as Synapse — renamed Synsoft — and Sega.

As business escalated, Brown says running US Gold became a managerial nightmare! Hence the involvement of two directors, John Woods and David Ward of Ocean Software, on a directorship basis handling marketing and advertising.

So how did a small company rapidly establish a firm place in the software industry?

"We condensed the best of two years of American software into three months," says Brown. "It is difficult for a UK company to match the standard of American software.

"Perfection and innovative concepts"

Technical knowledge of the 64 is unsurpassed in the States. American companies have already reached the stage where they take time to perfect a game and come up with concepts that are innovative."

What about comparisons to other companies currently marketing American software?

Brown comments: "The only difference between us is that we were the first to do it. We have chosen the best American software houses — other companies have got the stuff we didn't want."

Admitting that perhaps the industry has had an overkill of US Gold software Brown says: "We originally set out to market 10 American software companies with the brand name of US Gold. That's where we've gone wrong.

"US Gold as a brand will begin to take more of a back seat. It is a strong marketing label, but the American companies can stand on their own feet."

Launches of more new labels are underway with more in the pipeline. With only one adventure to US Gold's credit, new label All American Adventures (AAA) as the name suggests will remedy this situation.

"America is full of tried and tested adventures," says Brown. Following the initial title Ultima 3, Brown says 25 more titles will quickly follow. Some will be available only on disk due to their complexity.

"Adventures, arcades and simulation"

In the realms of 'famous names' games are Conan the Barbarian and Indiana Jones, while US Gold aims to continue an interest in simulation. "It's only a small market," says Brown. "But we want to be in it."

This year will also see the release of the original arcade versions of games such as Pole Position and Dig Dug. Despite the proliferation of arcade copies, Brown feels there will still be an interest in the 'real' versions. And as a word of warning he says: "We will take legal action against anyone who has infringed the rights." If this comes to fruition, US Gold will be fighting many software houses!

Other new avenues include the licensing of software from Europe, under the label Eurogold. "They are further behind in standards than we are," says Brown. "However there are good programmers out there looking for a market."

It is also interesting that US Gold is to license UK products to America, particularly bearing in mind Brown's claim that American software is one step ahead. He says: "In my opinion there are some games that will be successful. Games in a class with Psi Warrior from Beyond and Valhalla."

In a move to broaden the company's horizons, US Gold are entering the utilities market.

Brown says: "We are releasing software along the line of small business packages, music packages and a limited amount of educational software.

"Most educational software is either ritual or simple questions and answers — I haven't seen many programs which teach trigonometry."

"All the hype of the record industry"

Brown foresees a growing parallel between the computer and record industries.

"Computers will soon be in every home," says Brown. "There may come a day when someone wants Zaxxon soap!"

In line with this train of thought is the launch of the US Gold Club. For a small membership fee, members receive a sweatshirt, posters and regular newsletters with information on games and special offers.

Something for US Gold fans to look forward to is the imminent release of Beach Head II, which Brown is convinced will meet with the same success as the original Beach Head.

Aiming continually to match, if not better, the success of previous releases Brown says: "You're only as good as your next product."

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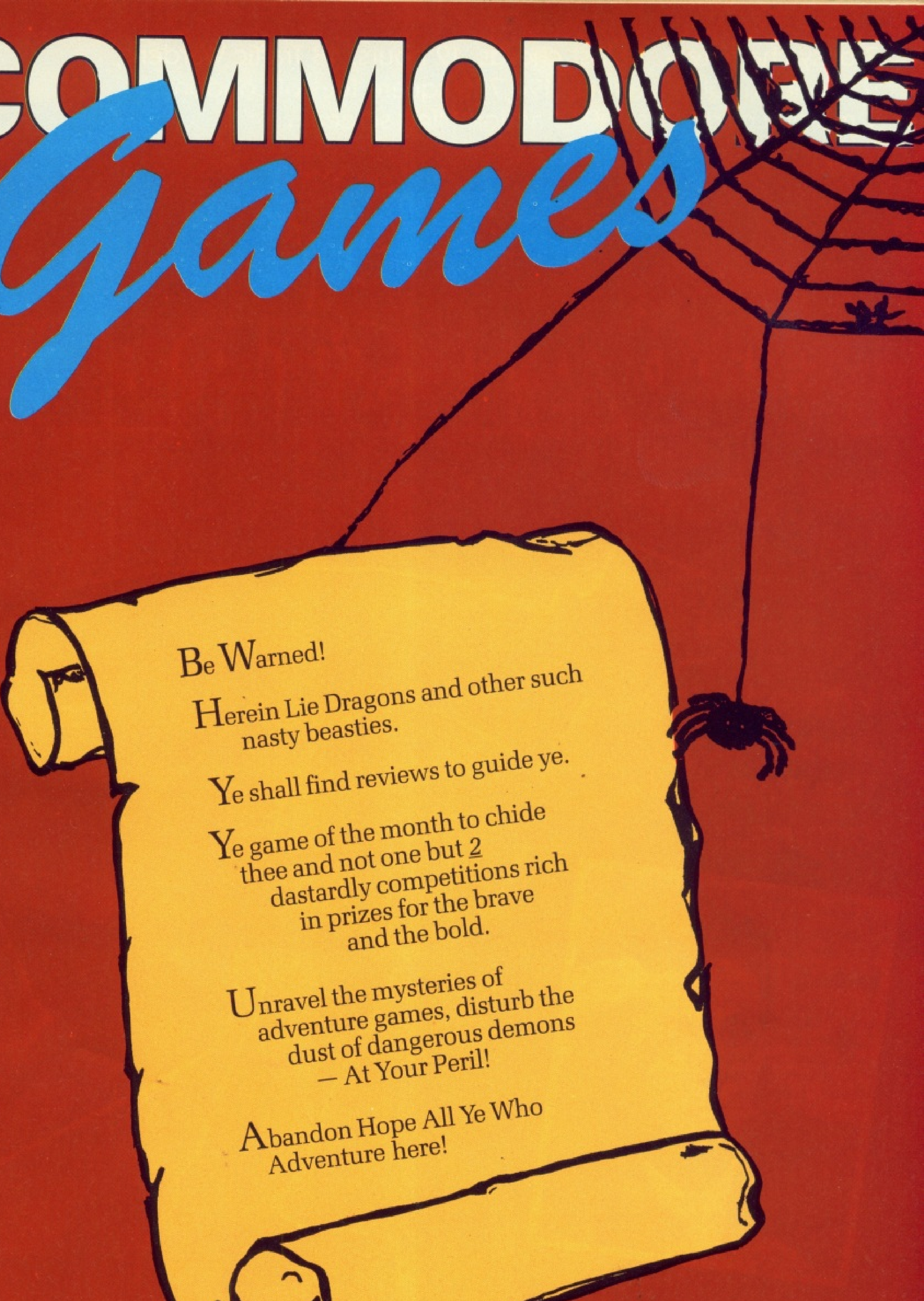
COMMODORE Games

APRIL ISSUE 1985



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Ye game of the month to chide thee and not one but 2 dastardly competitions rich in prizes for the brave and the bold.

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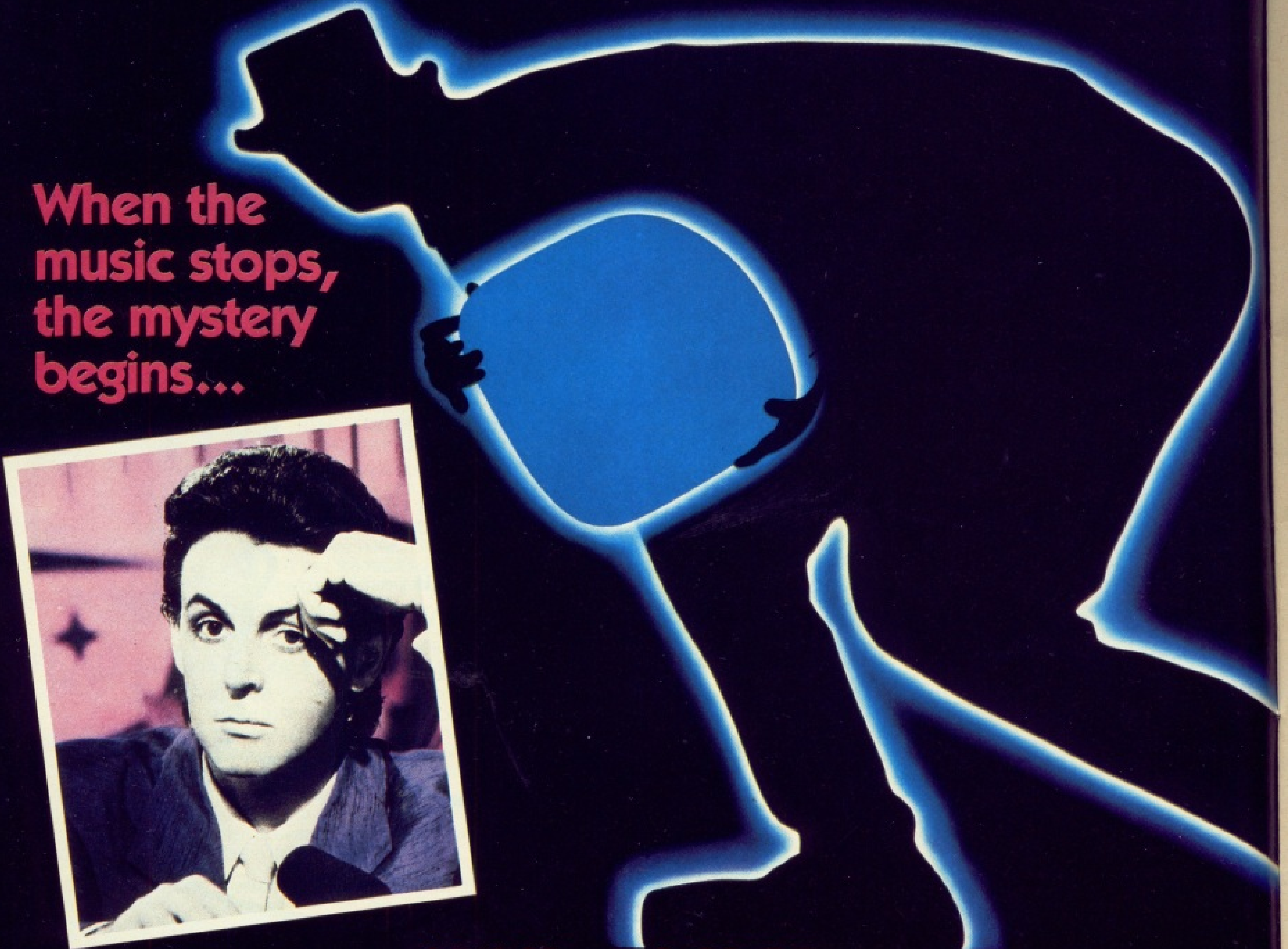

When the music stops, the mystery begins...

MIND GAMES

COMMODORE 64 – £7.99

mpL

Argus Press Software Group

20th CENTURY FOX

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NEW GAMES RELEASES

ARCADE GAMES

Dark Tower and **Penetrator**, (£7.95 and £6.95 cassette, respectively), released for the 64 by Melbourne House, Castle Yard House, Castle Yard, Richmond, Surrey TW10 6TF. Tel: 01-940-6064.

Software Star, (£7.95 cassette), released for the 64 by Addictive Games, 7A Richmond Hill, Bournemouth BH2 6HE. Tel: 0202-29640.

Moon Cresta, (£6.95 cassette), released for the 64 by Incentive Software Ltd, 54 London Street, Reading RG1 4SQ. Tel: 0734-591678. Alcatraz, (£2.99 cassette), released for the 64 by Probe Software, 74 Ribblesdale Road, London SW16 6SE. Tel: 01-769-2133.

Seaside Special, (£6.90 cassette), released for the 64 by Taskset Ltd, 13 High Street, Bridlington, Yorks YO16 4PR. Tel: 0262-602668.

Give My Regards To Broad Street, (£7.99 cassette), released for the 64 on Mind Games label by Argus Press Software, Liberty House, 222 Regent Street, London W1R 7DB. Tel: 01-439-0666.

Captain Starlight, (£6.99 cassette), released for the 64 by Romik Software, 272 Argyll Avenue, Slough SL1 4HE. Tel: 75-71535.

Superstars, (£8.95 cassette), released for the 64 by Martech, Martech House, Bay Terrace, Pevensey Bay, East Sussex. Tel: 0323-768456.

Hypercircuit, (£7.95 cassette, £11.95 disk), released for the 64 by Alligata Software, Orange Street, Sheffield S14 DW. Tel: 0742-755796

ADVENTURE GAMES

Time Search, Mountain Palace, Castle Dracula and **Colossal Cave**, (£7.95 cassette), released for the 64 by Duckworth, The Old Piano Factory, 43 Gloucester Crescent, London NW1 7DY. Tel: 01-485-3484.

Grand Larceny, (£7.95 cassette), graphic adventure for the 64, and **The Hobbit**, now available on disk for the 64 with additional graphics (£17.95), both released by Melbourne House, Castle Yard House, Castle Yard, Richmond, Surrey TW10 6TF. Tel: 01-940-6064.

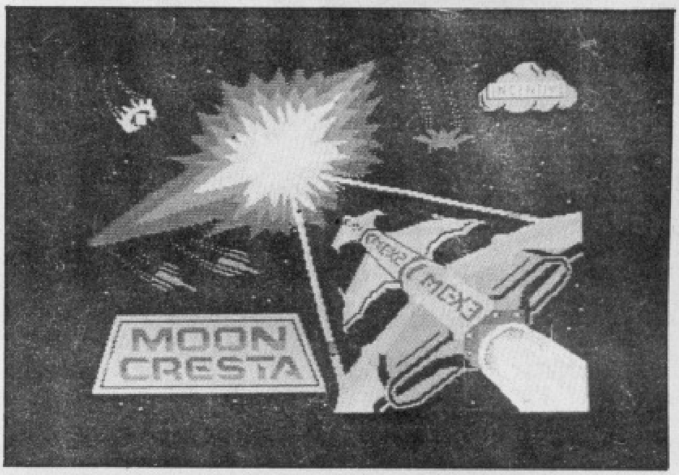
Shades, (£8.95 cassette), 3D adventure released for the 64 by Durrell Software, Castle Lodge, Castle Green, Taunton, Somerset TA1 4AB. Tel: 0823-54489.

Tripods, (£11.50 cassette), interactive multi-player (1-4) adventure released for the 64 by Red Shift Ltd, 12C Manor Road, Stoke Newington, London N16 5SA. Tel: 01-800-1333

MISCELLANEOUS

Deus Ex Machina, (£15 audio cassette and computer cassette), released for the 64 by Automata UK ltd, 26 Highland Road, Portsmouth, Hants PO4 9DA. Tel: 0705-735242.

Microgo 1, (£9.95 cassette), Japanese board game released for the 64 by Edge Computers Ltd, 3 Junction Road, Reading, Berks RG1 5SA. Tel: 0734-65852.



Three stage docking and multiple fire power are among the features of this new 64 release called Moon Cresta. Incentive Software, which bought the license from Nichibutsu, is offering a prize of a Moon Cresta arcade machine to the player who first scores 30,000 points.

NOT TO BE DESCRIBED

Automata UK Ltd. says the nearest term to describe its new game for the 64 is "tele-fantasy."

Consisting of two cassettes – an audio soundtrack and a computer game cassette – along with a poster and instructions, Deus Ex Machina is best played with a set of headphones "for the full benefit of the game," says a company spokesman. The audio soundtrack is synchronised to the computer game and dials up various characters such as a crooked police officer, whose voice is done by Frankie "Carry On" Howerd. Other familiar voices that turn up from time to time include Ian Dury and Jon Pertwee, and the poster gives words of songs and the script.

The name of the game is taken from the Latin for a character put into a play to throw it off track. The player's goal is to live an ideal life by "maintaining as much of the ideal entity as possible," whatever that means.

The package of two cassettes and poster retails for £15.

Contact: Automata (UK) Ltd, 26 Highland Road, Portsmouth, Hants PO4 9DA. Tel: 0705-735242.

MORE TEASERS ON ROCKY HORROR

CRL is continuing its hype of the upcoming game, The Rocky Horror Show, with teasing tidbits of news filtering out just when you're about to forget it.

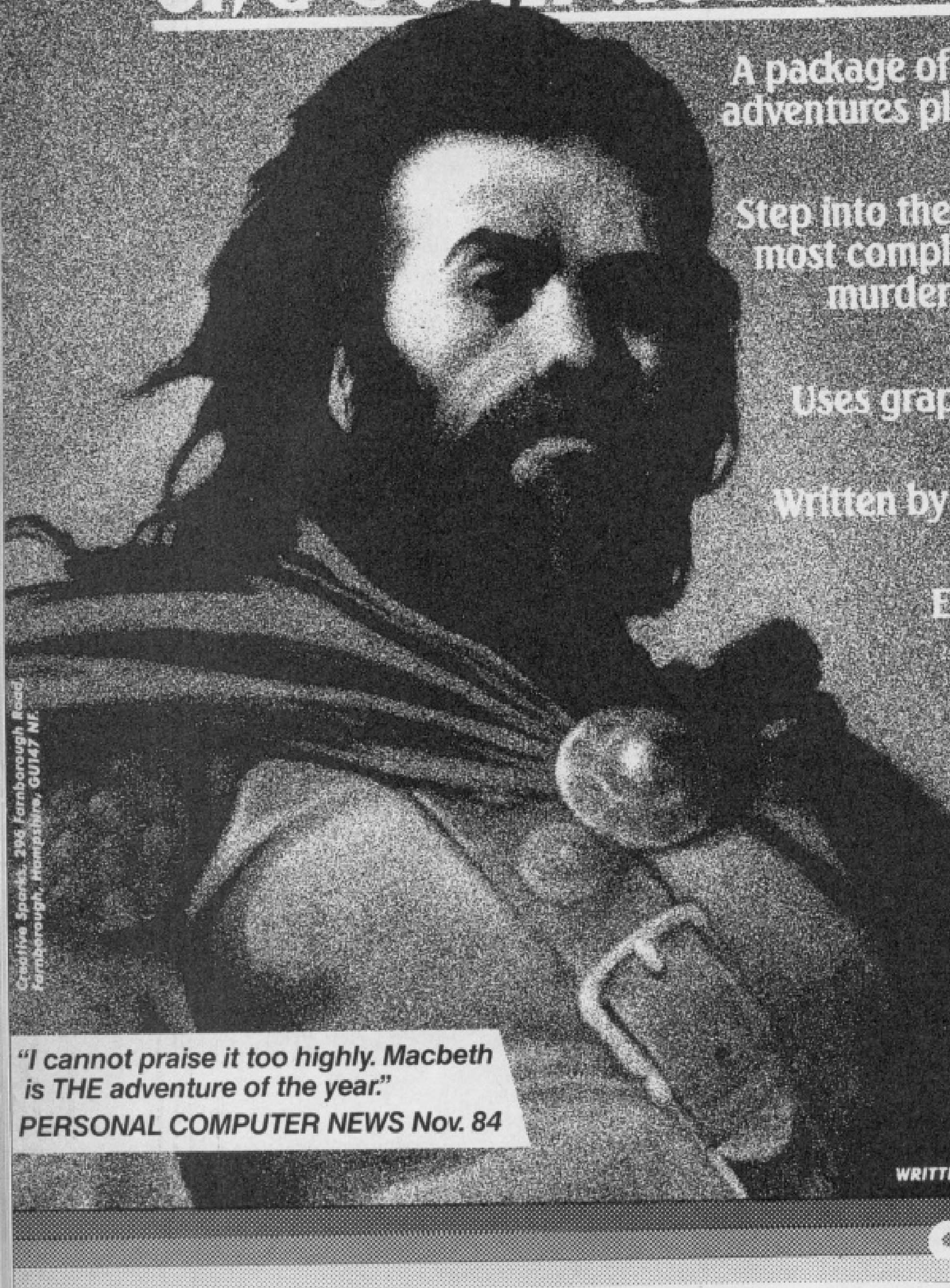
The latest details reveal the game will be a fully animated graphic adventure – "that's right, no text." CRL is calling it "Rockyramascope" and says the player can take the roles of either Janet or Brad, characters you'll be familiar with if you are a Rocky Horror fan.

But an adventure game usually requires that you find something and CRL are not yet willing to reveal what, or much of anything else for that matter.

RISKY BUSINESS

The creator of the ever-popular and complex Football Manager computer game has designed another take-charge spree.

This time the player is responsible for the running of a software company, which in these days of dwindling numbers could be quite a risky undertaking! "In Software Star you take control of a software



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house and aim to take it along the precarious path to success."

At £7.95 on cassette for the 64, the average boulders, monsters and pits that mark obstacles in most arcade games are replaced by staff problems, advertising decisions, finance and game launches. (Perhaps Addictive should sponsor a competition among the chiefs of real-life software companies to see who stays afloat. An omen perhaps?)

Contact: Addictive Games, 7A Richmond Hill, Bournemouth BH2 6HE. Tel: 0202-296404.

ONE AFTER ANOTHER ADVENTURE

Duckworth Publishers is keeping up interest in the computer adventure market with four more releases since the new year began.

The most recent offering, Time Search, is set in a "weird and mysterious land where anything is possible." Although in text-based format, Time Search is promised to provide danger and excitement. If it's any clue (and it isn't to us), Duckworth says, "Remember, none but the brave deserve the fair and there is no present like the time." Eh?

Peter Gerrard, a contributor to CCI, has converted the original Crowther and Woods mainframe quest, Collossal Cave Adventure, for the 64. The player must fend off a nasty Troll, a dragon and a pirate, all the while making his way through traps and mazes determined to bring any intruder quickly to his death. And help is not free here; each time you ask the computer for assistance, you will sacrifice some very hard-to-get points.

Castle Dracula draws the player into the world of the "Transylvanian Terror," alias "His Putrescence," alias Dracula. With more than 100 locations to discover and objects, useful or not, hidden along the way, the game may take some time so a save feature lets you store your progress on tape.

Mountain Palace Adventure, written by John Ryan, starts on a mountain precipice near the entrance of a treasure-filled palace. The save game option may be helpful as you make your way slowly through the precious, but dangerous palace.

Each of the adventures are on cassette £7.95.

Contact: Duckworth, The Old Piano Factory, 43 Gloucester Crescent, London NW1 7DY. Tel: 01-485-3484.

STOP PRESS

Witchswitch, (£8.95 cassette), arcade game designed by Psychic Engineering Control Group, released for the 64 by English Software Company, Box 43, Manchester M60 3AD. Tel: 061-835 1358.

Parky And The Yellow Submarine, (£6.95 cassette), adventure game released for the 64 by Cheetahsoft Ltd, 24 Ray Street, London EC1R 3DJ. Tel: 01-833 4909.

Pastfinder, (£9.99 cassette), arcade game released for the 64 by Activision UK Ltd, 15 Harley House, Marylebone Road, Regents Park, London NW1 5HE. Tel: 01-486 7588.

Sorcery, (£8.95 cassette), arcade adventure released for the 64 by Virgin games Ltd, 2-4 Vernon Yard, 119 Portobello Road, London W11 2DX. Tel: 01-727 8070.

You've played the game.. now read the book

The Commodore 64 Adventurer is a book for those of you stuck in the middle of a favourite adventure.

Solutions for four popular adventures — Heroes of Karn, Lords of time, Voodoo Castle, and The Count — are provided. (see a review of the book in this month's Book Reveiws).

Lords of Time, from Level 9, is the adventure this competition is based on.

Proving popular in the year since its release, Lords of time is an adventure with nine time zones. Each represents a period in Earth's history.

There are nine objects marked with hour-glasses which must be collected and joined together to defeat the Time Lords.

All you have to do is to answer the following three simple questions. The first 10 entries to receive us will receive a free copy of The Commodore 64 Adventurer.

We are giving away 10 FREE copies of The Commodore 64 Adventure book published by Duckworth

Q. Who has the Firefly?

A. ______________________

Q In what object is the Snow Queen imprisioned?

A. ______________________

Q How do you capture the Brontosaurus?

A. ______________________

Name ______________________

Address ______________________

____

Going for gold

Read on to see if you are among the winners of Gilsoft's Gold Collection competition...

Our Gilsoft Gold Collection competition is prime testimony that "it's all a matter of taste."

CCI asked you to put our list of Adventure Ingredients in order of priority "as decreed by the CCI Adventure Master." Of course, we know not everyone thinks alike but you would have to go and prove it wouldn't you?

Some of the contestants did get the first crucial few traits in correct order so we started from there in picking the winners, giving weight of course to those who were among the quickest to respond. Prizes should be arriving on each winner's doorstep any time.

The correct order for the answers was **B-Originality, G-Atmosphere, E-Sufficient Vocabulary, H-Save Game Feature, C-Speed of Response, D-Variety of Response, F-Logical Solutions to Problems, A-Use of Graphics.**

If you want to know more about computer adventure games, how they started and what makes them tick, take a look at our special feature this month — everything you need to make you life an adventure!

Winners...

Hearty CONGRATULATIONS! The top ten Gold Collection winners, who will be receiving their sets of eight Quill-written adventures from Gilsoft are:

TM Towler of Bournemouth; Jerome Pimmel of St Peter Port, Guernsey; Martin Younger of Stockport, Cheshire; Miss T Carroll of Allesley Park, Coventry; Mr GI Liddle of Dusseldorf, West Germany; Colin Bray of Haywards Heath, West Sussex; H Panpya of Wembley, Middlesex; Ken Smith of East Ham; Michael HR Burgher of Kelso; and MJ Wooddissee of Garelochhead, Dunbartonshire.

And here's a toast to the next 100 who got closest to the answers chosen by the Master and win their choice of one of the eight Gold Collection games. they are:

Hal Jensen of London W1, Mike Davies of Dyfed, Wales; Mr Keith Evans of Liverpool; RS Clothier of Fareham, Hants; Mr Andrew C Mail of Dorchester, Dorset; Beernaert Eddy of Staden, Belgium; Mr M Griso of London N11; Mr KA West, London E11; R Palmer of Stafford; Garry Collins of London E4; T Hedge of Shewsbury, Shropshire; Mr Graham J Hadfield of High Crompton, Shaw Oldham; Mr S Dyke of Isle of Wight; Martin Herbert of Abergavenny, Gwent; Ian Burns of Warley, West Midlands; Mr C Heath of Paisley, Scotland; Bronwen A Rochelle of Rhos-on-Sea, Clwyd; Alan Blattner of Churchdown, Glouchester; S Bateman of Middlesborough, Cleveland; David Wise, Enfield Middlesex;

winners...

Mr KT Crump of BFPO 23; L Angotti of Hanford, Stoke-on-Trent; J Downing of Dronfield, Sheffield; Nigel Bradshaw of Washington, Tyne & Wear; Terry Cullen of Southall, Middlesex; A Linday of Long Eaton, Notts; Sean Buchan of Reigate, Surrey; KR Dibling of Bootle, Merseyside; S Bhana of Birmingham B8; Mr SJ Bailey of Corsham, Wilts; Peter Krischiw of N Chorley, Lancs; RD Kennedy of Maidenhead, Berks; Ian Pollard of Gravesend, Kent; BR Hewlett of Ebbw Vale Gwent; John Stanwiz of Kirkby Stephen, Cumbria; Stephen Webber of Brighton, Sussex; Matthew Hathorn of Grange-over-Sands, Cumbria; Mr M Cairns of London W5; Christopher Jessett of Yarnton, Oxford; Maurice LeVallois of Renfrewshire, Scotland;

Bryan Hawkes of Doncaster, S Yorks; Donald Chiew of London W14; Mr DM Lloyd of Neath, West Glams; Mr and Mrs D Rawnsley of Messingham, South Humberside; Mrs P Taylor of Wimborne, Dorset; NF Weatherhead of Aylesbury, Bucks; RA Mascall of Thornbury, Bristol; Miss R Bland of Shenfield, Brenhwood; Graham Tiller of Bournemouth, Dorset; MT Osbourne of Studley, Warwickshire; Barry J Williamson of Cambridge; Mr Michael A Lyons of Offerton, Stockport; Robert Ellis of Knowle Park; Teven Lai of London N15; Jason Humphries of Walsall, West Midlands; Amer Butt of Manchester M27; Pauline Johnson of Middlesborough, Cleveland; Ken Casemore of Farnborough, Hants; Jamie Carter of Wilmington, Kent; AJ Harsley of Scunthorpe, South Humberside;

RC Coppock of Northwich, Cheshire; A Johnson of Fleetwood, Lancashire; Terry Delaney of London E3; Andrew Saunders of Billinge Wigan, Lancs; Richard Wing of Formby, Merseyside; Stephen Fairclough of Liverpool; Kim Yarwood of Hatfield, Herts; Patricia Green of Mannamead, Plymouth; Mark Wharrier of Bedlington; Mr EA Moore of Washington, Tyne & Wear; Mr RK Drayson of Bournemouth; AH Bowden of Takeley, Stortford; Jatinder Sidhu of Southall, Middlesex; Ian Robertson of Sunbury, Middlesex; John Shirley of BFPO 29; Anurag Sharma of Gateacre, Merseyside; Mrs V Millward of RAF Laarbruch; Joanne Harrison of Bidulph, Staffs; BG Cormack of Kimbolton, Huntingdon; Tim Criggs of Reading, Berks;

winners

ME Ventham of Radlett, Herts; Mr B Buckley of Preston, Lance; Nicholas Jones of Llanidloes, Powys; Andrew M Rawlinson of Shrewsbury, Shropshire; MG Sowman of London W11; AG Elwell of Wolverhampton, West Midlands; Mr PW Lufflum of Marchwood, Southampton; Peter Cordes of Copenhagen, Denmark; Michael C Freeman of St Albans, Herts; Mr MP Green of Gainsborough, Lincolnshire; Mrs T Dutton of Westerham, Kent; Capt RW Wise of Ruddington, Nottingham; Carl Baver of Byfleet, Surrey; Martin Wilson of Sheffield; HH Sabharwal of Isle of Man; Jacques Brasme of Vitry en Artois, France; Mrs Susan M Lees of Huddersfield, W Yorks; Dean Wakerley of Liversedge, W Yorks; Ian Davie of Shepshed, Leics; and P Burton of Borehamwood, Herts.

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Adventure

The growing sophistication of the Games World

You enter a room with many exits, and are so confused you're not sure which one to try first. They're marked: Text-Only, Graphics, Moving Graphics, Arcade Adventures, Interactive Fiction, Multi-User, Role-Playing and even Educational Adventures. What now?

Yes, you are a newcomer to the world of adventures, and don't know where to start. Does it matter? Yes, it does. If you're learning to read you don't plunge into *War and Peace*, you start with something simpler, like *Janet and John Play Doctors and Nurses.* To learn about adventures you'd be ill-advised to start with *M.U.D.* the multi-user game on Compunet, where straightaway you'd be playing against experienced adventures and it would be a costly way of learning how to die several times in quick succession.

Most adventures aren't multi-users, though, it's just you against the computer. Or rather it's you and the computer against whoever wrote the devious program. In fact the original computer adventure developed partly as a means of getting away from the need to have several players before you could participate in a role-playing game. It came out of the popularity in the late sixties and early seventies for the *Dungeons and Dragons/Fighting Fantasy* games, which is why the theme of so many adventures is the Middle Earth quest, the battle against wizards and dragons and people with funny names. Don't worry if that's not your style, though, and the thought of a dead orc leaves you cold, as adventures now cover any theme, from science-fiction to the Bible, and the Commodore adventurer can play the part of anyone from Denis Thatcher to Arthur Dent.

A familiarity with *Dungeons and Dragons* will help you understand how a computer adventure works. For those not familiar, *D&D* has several players taking part in a kind of quest: looking for treasure, fighting evil, or both. As with a board game like *Cluedo*, each player is a different character, perhaps a cleric, a wizard, or a brave but simple warrior, and as they progress through the story (there are hundreds of storyboards and books available) they have to make decisions about which way to turn, and how to get past obstacles, or simply how to go about the task they've been given. The outcome of any decision is given by an independent character called the Dungeon Master, the outcome being governed by a complicated set of rules and a certain amount of chance. If you try to beat up a giant, the result will depend on how strong you are, what weapons you have, and obviously having a little bit of luck on your side too.

"Indulging your Fighting Fantasies"

The problem with indulging your fighting fantasies in this manner is that you need several other people all ready, willing and able at the same time. Suppose, though, you get a midnight urge to go out and kill a troll? What then? Thanks to computers, and a couple of Americans named Crowther and Woods, you can do it. They wrote a game on a mainframe computer and called it *Adventures*. It was a story set mainly in a network of underground caverns, where you had to search for as much treasure as you could find. The good news was that one person could play alone and leave the computer to make the Dungeon Master's decisions. The bad news was that you needed a mainframe computer costing several tens of thousands of pounds to play it on.

This was the mid-seventies (the *1970*'s for those youngters who think mainframes originated in the dark ages), and the text-only adventure was born. If you're not sure how adventures work, consider this original and exercise your imagination as if you were reading a book or listening to a radio play. The screen gives you a verbal description of where you are. In *Adventures*, once the game is loaded, the screen tells you that you're on a road, standing outside a brick building. You will then be asked what to do next. This game, like many others, requires you to type in a simple two-worded sentence, a verb followed by a noun, though some single words are understood by the computer's vocabulary. Should you type GO NORTH, for instance, you'll be given a new location description: you'll find you're now in an open forest. If you type GO SOUTH you'll find youself in a valley. Obviously each of these new locations gives you additional ways in which you can move, so it's easy to see how an adventure is made up of a map of inter-connecting locations.

The next stage is to add some movable objects to the story. Type ENTER BUILDING and you'll discover what it looks like inside. You'll also find that you can see a lamp, amongst other things. If you wish, you can GET LAMP or TAKE LAMP. If you then type INVENTORY or LIST, which are the usual commands that remind you what you're carrying, you'll be told that you're carrying a lamp, and the object will have disappeared from the location description. As you move round other locations you can DROP LAMP anywhere you like, and it will disappear from your possession and be added to the location again.

"Adventures are about solving problems"

So why add objects? Well, staying with the example of the lamp, you may find that you enter a location which is dark, and you're unable to see. Ah-ha, you think, getting the hang of things, perhaps if I had that lamp with me now I'd be able to see where I was. And you might be right. Adventures are about solving problems, of which this is a very simple example. In this game, when you delve into the underground caverns you'll soon meet a snake which stops you going in any direction other than the one you've just come from. By the time you meet it you'll have stumbled upon other objects, so how do you get past the snake? Maybe the lamp will scare it, maybe you can kill it with the black rod, or maybe you can feed it the sandwiches you found in the picnic spot?

If you can understand these simple ideas then you understand the basics of how adventures work — though believe me, they get a lot more complicated and need a lot more ingenuity than discovering that a lamp gives out light. If you've never tried an adventure then this first one is a good place to start because it gives a very gradual introduction yet goes on to cover most of the features you'll find in other adventures. It's still one of the most popular, and is available for the Commodore 64 as *Colossal Adventure* from Level 9, *Colossal Cave Adventure* from Duckworth and in slightly altered form as *Classic Adventure* from Melbourne House.

Level 9's version is the first of a trilogy, and if you like text-only games then this is the software house to go for. Their *Snowball* is also a classic science fiction adventure, while *Lords of Time* has you roaming around through nine different time-zones trying to gather together clues and objects that will enable you to defeat the Evil Timelords.

"The ultimate in text adventures"

Before moving on to graphics adventures, let's stick with words and the ultimate in text adventures, the interactive fiction of Infocom. The description 'interactive fiction' sounds grand, but basically they're just very big text adventures — so big that they're only available on disk. There are too many titles to list altogether, but every one is excellent, and they come in two different packages that might be called hardback and paperback. As with those types of book, the paperback gives you everything the hardback does, but the packaging is cheaper. Hardback versions are distributed by Softsel at around £30, while paperback versions of most titles are done by Commodore themselves at £11.99.

Illustration on facing page courtesy of Creative Sparks; on this page courtesy of Domark

TELEGRAM

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The interactive tag comes about because of the way you can talk to the many other characters in the adventure, and the way they move about in much more complicated manner than is possible in a tape-based game. Take *Deadline*, for example, where you're investigating a possible murder mystery. You can quiz Mrs Robner, the dead man's widow, and you get a variety of responses depending on what you say to her — are you aggressive, sympathetic? Quiz the other characters involved — are they telling the truth, do they stick by their stories when other people are present? As with the similar *Suspect*, it's almost like being in a Raymond Chandler novel, and makes *Sherlock* look simple.

The latest Infocom release, of course, is The *Hitchhiker's Guide to the Galaxy*, which CCI will shortly be reviewing in full, but if you've got a disk drive, a sense of humour and thirty quid to spare then you have to buy this adventure. Wear your DON'T PANIC badge, examine the bits of fluff from Arthur Dent's dressing gown pocket, suffer the dreaded Vogon poetry, and feel the waves of depression every time Marvin enters the room. Adventures *are* about solving problems, but that makes them sound like double Maths on a wet Friday afternoon — they're also about fun, and you won't get more fun than with this hard but hilarious game.

"It wasn't long before someone added pictures"

Adventures began with words, because on early machines that's all you could display, but with home micros and their graphics capabilities it wasn't long before someone added pictures to an adventure.

The someone was Melbourne House, and the adventure was *The Hobbit* — another essential for the Commodore collection, I'm afraid. Here you play the part of Bilbo Baggins in a fairly faithful but obviously condensed adventure taken from Tolkein's book, and you have to buy it if only to discover what lies behind those endless pleas in the adventure help columns: "How do I escape from the goblins' Dungeon?"

The addition of graphics to an adventure is quite simple to understand — it just means that instead of lengthy verbal descriptions for each location, you get a drawing and a brief description (though text-only adventures can be equally terse). If an adventure is good, it doesn't really matter whether it's graphics or text, but recently software houses have been following the trend of saying that an adventure must have graphics. I'd rather have good text than poor graphics (which eat away the K's), and good graphics than poor text, but once you start playing adventures you'll probably come down on one side or the other.

"An incredible feat of programming"

If you see an adventure that's said to have moving graphics, this normally means that the picture will change according to your actions. A scene with a closed window will be redrawn to show it open if you type OPEN WINDOW, for example, or a lamp will disappear from the scene if you take it. The more graphics options you have then the fewer words there's room for, and you're moving towards the completely visual arcade adventures. Halfway between the two extremes, though, and in a category of its own is *Valhalla*, from Legend. You might call this an animated or cartoon adventure, as the matchstick character on the graphics screen moves and acts according to your instructions, although obviously with that level of graphics sophistication those verbal instructions are much more limited than in a conventional adventure. For this reason some adventurers found it disappointing on the long-term, but it's certainly an incredible feat of programming. It contains 81 locations, and your character is trying to find his way to Valhalla, which he must do by locating certain quest objects in a particular order. He has the help and hindrance of many characters from Norse legends, who go about their business independently — they'll wander on and off screen, pick fights with each other, beat you to the booze and food that you need for survival, and so on. *Valhalla* was a step forward, or maybe sideways, in the development of adventures.

I won't say much about arcade adventures, partly because they're more arcade than adventure, and partly because the best from Ultimate aren't available for the Commodore 64, though their recent release, *The Staff of Karnath*, is only available for that machine. This is the visual adventure, where you maneouvre an animated character through a series of connected locations, looking for spells to fight the monsters you'll meet, and also 16 pieces of a key. The graphics are brilliant, and regardless of how it's classified, this is a brilliant piece of software.

Illustration courtesy of Trillium

"The best adventure of 1984 – Macbeth"

Rumour has it that the other Ultimate titles are being converted, but don't sit round moaning about what you're missing. Enjoy the best adventure release of 1984, available only on the 64, and that's *Macbeth* from Creative Sparks. Not one adventure but four, accompanied by four sessions on the psychiatrist's couch probing your motives in the adventure you've just completed ... or failed to complete. Normally with an adventure I have a quick look though the notes and then load it up to see what it looks like, but here I became so absorbed in the background information you're given to Shakespeare's play that I was still reading an hour later. At school I was never a fan of the bard, but if all the plays were presented this way then I certainly would have been.

You play the part of Macbeth twice, of Lady Macbeth once, and you also get to aid the three witches as they hunt for eye of newt and toe of dog (or whatever else they had instead of baked beans in those days). Here the graphics do add to the atmosphere, being beautiful to look at, and the important thing is that the adventures work as adventures first, adding almost incidentally to your enjoyment and understanding of the original play, which is full of drama and quests and battles and gore — all good clean fun to the regular adventurer.

"Prizes large and small"

The reward for playing through *Macbeth* successfully is that you get to stay alive, while other adventures dangle carrots before players' noses in the form of prizes large and small. The first was Automata's *Pimania*, a silly romp with cartoon sequences, all looking rather dated now, though the prize worth £6,000 remains unclaimed. Even that handsome amount is dwarfed by Domark's *Eureka* program, where a cool £25,000 is up for grabs. *Eureka* contains five adventures, and was written by Ian Livingstone, author of many a Fighting Fantasy story ... and I do mean many, his sales zooming up into the millions now. What you're looking for here is not a treasure chest or magic sword, but a phone number. Naturally it's the number you ring to claim the prize, but to work out what it is you have to visit the five time zones where the adventures take place. One is set in modern times, another in the Second World War, a third in Arthurian Britain, one in Roman days and the final one in the inevitable prehistoric times, where a flying pterodactyl gets in on the act. The graphics generally are quite good, but the text is ultra-brief. The problems are naturally hard, with some of them being downright obscure, and if it wasn't for the tempting prize it's not an adventure you'd normally recommend. But there *is* that prize, so...

Also dishing out prizes is Commodore's own *Spirit of the Stones*, with diamonds now at stake. Yes, real ones, 41 of them hidden (in theory at least) on the Isle of Wight. Solving riddles in the adventure and in the accompanying book should enable you to say where you think the diamonds are. The story concentrates on the legends of the Isle of Wight, the stories of ghosts, banshees, poltergeists and so on — it makes a change from the late-night horror movie, anyway.

"Everyone plays adventures in different ways"

The only horror connected with *M.U.D.* will be when the phone bill arrives, for this game, *Multi-User Dungeon*, is only available via the Compunet system (a marvellous coup for Compunet), which allows you to log on to the mainframe DEC-10 computer at Essex University which controls the game. You can regard this as the Dungeon Master, if you like, for the unique quality of *M.U.D.* is that great numbers of people can be playing at the same time. The landscape and location descriptions remain the same, but objects get moved around, and of course the characters are moving around too, including the one that represents you. Your aim is to collect points and improve your status, but with everyone out to do the same it can be a pretty cut-throat business. Everyone plays adventures in different ways, so the tactics of some are bound to be to go around killing off everyone they can find — especially as you get lots of points for this, taking a percentage of the points belonging to the character you killed. Not a game for the peaceniks! Nor is it a game for the novice adventurer, as straight away you'll be in the same battle arena as people who've played the game for a long time, who have maybe explored all its nooks and crannies and now delight in roaming the land looking for innocent victims like you. Gain a little experience at conventional adventures first.

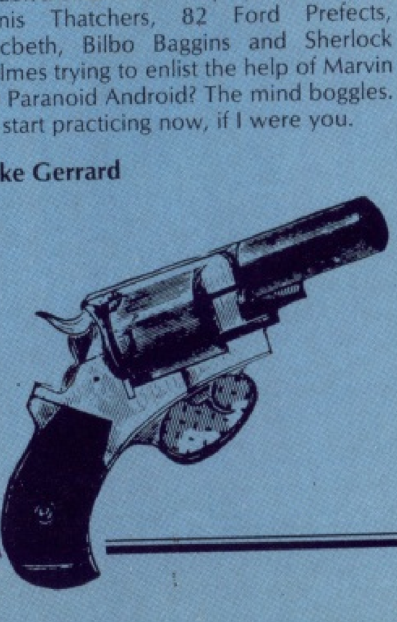
Illustration courtesy of Adventure International

Illustration courtesy of Melbourne House

"The adventure game has come round full circle"

With the arrival of *M.U.D.* the adventure game has come round full circle, in a way, developing as it did out of the problem of organising multi-player games when multi-players weren't available. Now you can scour the country for like-minded souls and you can bash each other's brains out into the night. When you look at the way that adventures have developed from that original game, it's interesting to speculate on what might happen in the future. Certainly there will be more attempts to set up multi-user games ... will we then be able to inhabit a bizarre landscape peopled by 17 Denis Thatchers, 82 Ford Prefects, Macbeth, Bilbo Baggins and Sherlock Holmes trying to enlist the help of Marvin the Paranoid Android? The mind boggles. I'd start practicing now, if I were you.

Mike Gerrard



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for 1 to 4 players extending
over 64 colourful locations.
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Castle Lodge, Castle Green, Taunton, Somerset, TA1 4AB

Adven

THE MAGIC SWORD

A beautiful princess, a castle with secret passages and dungeons, a wicked witch and heaps of magic are the ingredients for this adventure designed for young children.

There are several adventures designed for the young, but many fall into the trap of being too simple to maintain interest. The Magic Sword is a very basic adventure but it has a certain charm which lifts it above the others.

One definate bonus is the accompanying 48-page book which begins the tale ... Princess Poppy meets a new friend, Prince Fred, and begins a game of hide and seek, but the wicked witch catches her and locks her up in the tower. Fred comes to the rescue and is turned into a frog.

The game takes over the tale with your task being to defeat the witch and rescue the prince and princess.

As with other children's adventures, you don't get some of the usual adventure options such as examining objects. Instead you have the set options of direction of movement, 'get' and inventory. An on-screen compass flashes the directions that are open to you. This is a useful device in encouraging the young to attempt some logical thinking and to make decisions.

Graphics are simple, but clean and effective. Text is written in double-height characters to make it easier to read — a thoughtful touch. The response time is also fast enough to ensure continuity.

A touch of humour adds to the enjoyment of the game. For example when you come across the frog, if you type in 'get frog' the computer replies 'ughh no fear!'.

A worthy introduction into the world of adventures.

Fast loader: Yes
Graphics: ***
Sound: **
Playability: ****
CCI Rating: ***
Price: £8.95
Company: Database Publications, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY. Tel: 061- 456-8383

SUSPENDED

Rarely will you "see" so much in white text on a blue screen.

This excellent Infocom adventure is one of those rarities that doesn't rely on graphics – and doesn't need to. An accompanying "briefing" manual sets the scene with a vividly-portrayed atmosphere that drops you in the middle of something like 2001: A Space Odyssey. The sophisticated high technology is implied as much as described in the manual and accompanying map of the underground complex setting.

You must solve a series of futuristic problems on the planet Contra with the help of six robots that provide the senses you are deprived of in your state of suspended animation. Each robot has its speciality — sight, hearing, information storage, etc — and a sense of humour to lighten the stressful moments when you are trying to save your world.

Suspended is as good technically as atmospherically. It accepts up to two lines of commands at once, allows prepositions and even encourages the use of adjectives in your input. With a vocabulary of up to 600 words, the computer is quite easy to communicate with. Written instructions nevertheless are quite involved, almost as if you

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Illustration by Alison Watson

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were undergoing formal training for the important task you've been assigned. The program also will prompt you occasionally and sometimes fills in gaps such as what will be used to perform a task you've commanded.

The robots' "reports" are entertaining in themselves with complete descriptions of their movements and reports when they arrive at a place you've designated. At least one of them can be quite flirty as well — Iris, who refers to her "dainty extensions" and to you as "good-looking." (The assumption that the player is male is a bit off-putting particularly since this one isn't.)

Other special functions allow a game to be saved and printed out.

A map of the Complex with moveable stickers representing the robots' locations is another perk. **Suspended will have you suspended in front of your computer for hours and your brain teeming with images of every nook and cranny in the Complex.**

Fast loader: N/A
Graphics: None
Sound: *** (for music)
Playability: *****
CCI Rating: *****
Price: £11.99 disk
Company: Infocom, distributed by Commodore UK, 1 Hunters Lane, Weldon, Corby, N. Hants NN17 1QX. Tel: 0536-205252

SHERLOCK

It would be difficult to top The Hobbit as a magnificent computer adventure, but Melbourne House has tried with some, albeit imperfect, success in Sherlock.

Granted the text and storyline are among the most involved and complex on the market, a series of "devious bugs" that crash the program are frustrating for the player who happens to think of an original action. In this case, original seems to mean anything the program doesn't know what to do with.

Apparently, one of the problems is the complexity of the program and the fact that it is played in real time. As a result, if you take too long about what you are doing, some crucial opportunity may have passed you by. Depending on the situation, your next input may not make sense because one word will be connected with another and then another within the program until it "ties itself into knots," says Alan Giles of Melbourne House.

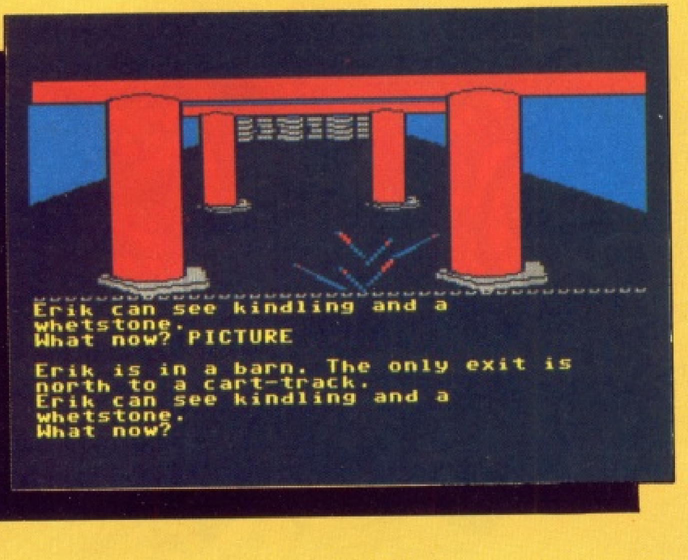
Examples of actions that will crash the game are talking to yourself or hailing a second cab right after another. Perhaps those are understandably confusing actions but neither of them were the situations wer encountered. In one case, we asked Watson to give us a newspaper he held. Is that so difficult or so absurd? Format was correct, but the program simply did not know what to do with the command.

Evaluating Sherlock was not an easy task. But the very reasons for the bugs say quite a lot for the game's complexity. Actions occur all the while your Sherlock is elsewhere. Accepted inputs include prepositions, conversations, complex actions, adjectives and adverbs — **all very impressive and hopefully an indication of the computer adventure's future.**

A good instruction manual and a compelling theme song to start you off are other plusses.

Fast loader: Pavloda
Graphics: ***
Sound: N/A
Playability: ***
CCI Rating: ****
Price: £14.95
Company: Melbourne House Publishers, Castle Yard House, Castle Yard, Richmond, Surrey TW10 6TF. Tel: 01-940-6064

SAGA OF ERIK THE VIKING



```
Erik can see kindling and a
whetstone.
What now? PICTURE

Erik is in a barn. The only exit is
north to a cart-track.
Erik can see kindling and a
whetstone.
What now?
```

Every silver lining has a cloud. At least that's the case in this adventure which casts the player as the Viking who must find the evil Dogfighters and rescue his kidnapped family.

Based on the book by Terry (Monty Python team) Jones, the computer adventure treats you with some very nice illustrations but they are much more colourful while they are being drawn than when complete. For some reason, the final colours in all cases we observed featured only three colours other than black. Another drawback is the time it takes to complete them and the fact that you cannot enter commands until the picture is finished. You could turn graphics off, but then you would be missing a very nice element of the game.

But even there is a catch. Have you ever seen the inside of a barn decorated in hot pink and bright blue? When is the last time you saw rounded pillars supporting a barn roof?

In text, you can use "it" to refer to a noun in a previous command, reducing some tedious repetition. While the vocabulary seems comprehensive, responses seem silly at times. A simple command to go in one direction yields the response that you are on a cart-track and "No one is here. Erik's family have been kidnapped." What does that have to do with the cart-track? Was his family there before? If so, we didn't notice. In another case, the computer lets you take kindling that you just used to light a fire. Ouch!

The story is a classic one and Erik's treck provides some interesting fun. An accompanying booklet contains extracts from Jones' book to give you clues.

Fast loader: None
Graphics: ****
Sound: None
Playability: ***
CCI Rating: ***
Price: £9.95 cassette
Company: Level 9 Computing, published by Mosaic Publishing, distributed by John Wiley and Sons Ltd, Baffins Lane, Chichester, Sussex PO19 1UD. Tel: 0243-784531

UPPER GUMTREE

Colourful, cartoon-type graphics are the first thing to strike the player when you load Upper Gumtree and an apparently good vocabulary follows.

Rather than the exceedingly dull "I don't understand" when your input doesn't make sense to the program, it gives a variety of interesting responses. And if you are understood the replies certainly are clever and complete.

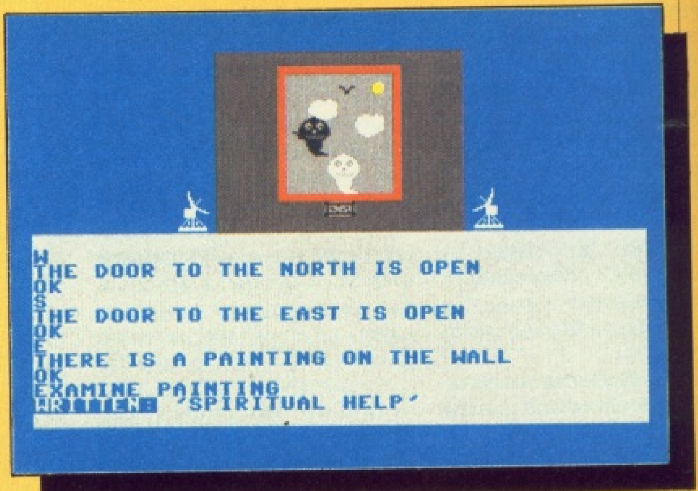
The computer adventure certainly does justice to its original storyline. You are the potential hero who must save the sleepy town of Upper Gumtree from the dastardly Professor Blowitovitz. Upper Gumtree may be boring, but the script keeps you entertained as you learn about the surprising places, people and things. Even the multitude of ways to die — speared by a bull, drinking poisoned water from a river or skewered with a pitchfork wielded by a nasty farmer — provides some unique twists and turns.

Graphics are lively, though simple and not animated. When night falls, the scenes appropriately turn quite dark, another element you'll have to cope with. Players can enter the Gumtree Gamer Award competition with certificates given to the ten who complete the adventure in the fastest time, confirmed by a code number given at completion.

It may not be as sophisticated as some adventures, but it is very good fun.

Fast loader: Yes
Graphics: *****
Sound: None
Playability: ****
CCI Rating: ****
Price: £6.50 cassette
Company: Richard Shepherd Software, Elm House, 23-25 Elmshott Lane, Cippenham, Slough, Berks. Tel: 06286-67148

MAGIC STONE



```
W
THE DOOR TO THE NORTH IS OPEN
OK
S
THE DOOR TO THE EAST IS OPEN
OK
E
THERE IS A PAINTING ON THE WALL
OK
EXAMINE PAINTING
WRITTEN: 'SPIRITUAL HELP'
```

This game risks its players falling asleep during the 10 minute loading time, but if you manage to sleepily type in a brief command the effective crash of a drawbridge will bring you back to life.

A haunted mansion in Transylvania (of course) is the setting and your job is to find the Magic Stone needed for turning lead into gold. One of the precious little objects that will help is a book bound with human skin — repulsive and tasteless to the ultimate!

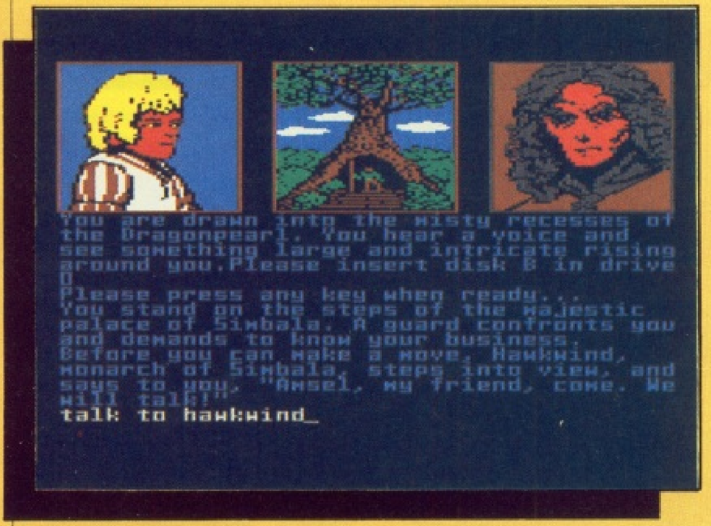
Vocabulary capabilities are poor and accompanying instructions don't give the help you need. Although the player is told, "You can always try help," typing "help" yields nothing more helpful than "Use your imagination." We also found answers such as "Bad object" very inappropriate at times.

The "examine" command flips the screen to the object itself to read or peruse at your leisure. you then press any key to get the cursor back but then the object and/or any descriptive text disappeas. An amulet in your charge also gives some help, but it will take a bit of doing to discover just what to do with it.

A few bright graphics in a small box make you wish they were better, though they do reflect changes at appropriate commands. The laboratory is one of the highlights with hidden panels and other suspicious articles to make you ponder. Tiny revolving satellite dishes to the side of the graphics box are puzzling. We haven't a clue to their purpose, if there is one. **Magic Stone's sound effects and other perks (a Magic Stone competition for example) enhance the otherwise unoriginal storyline.**

Fast loader: None
Graphics: **
Sound: ***
Playability: **
CCI Rating: ***
Price: £5.95 cassette
Company: Audiogenic Ltd, 39 Suttons Industrial Park, London Road, Reading RG1 6AZ. Tel: 0734-664646

DRAGONWORLD



```
You are drawn into the misty recesses of
the Dragonpearl. You hear a voice and
see something large and intricate rising
around you.Please insert disk B in drive
0
Please press any key when ready...
You stand on the steps of the majestic
palace of Simbala. A guard confronts you
and demands to know your business.
Before you can make a move, Hawkwind,
monarch of Simbala, steps into view, and
says to you, "Amsel, my friend, come. We
will talk!"
talk to hawkwind_
```

Another excellent interactive adventure from the Trillium stable. Based on the book, the computer version of Dragonworld is written by the same authors, Byron Preiss and Michael Reeves.

One look at the three double-sided disks and the beautifully-illustrated 16-page booklet indicates the amount of thought which has gone into this comprehensive adventure. The one thing that is sacrificed by this immense attention to detail is speed of response to commands, although this is more than compensated for in other ways.

You are Amsel and a message comes to you through the mystical Dragonpearl that the Last Dragon has been kidnapped. Together with your friend Hawkwind, ruler of Simbala, you must save him.

The vocabulary used in Dragonworld is extensive and full sentences can be used. More than one action can be included in one command, for example 'take the book, open it, then read it'. Just make sure that you stick to a logical order of events!

Due to the size of this game, the information required is stored on both sides of three disks. During your travels you will 'wander off the edge of the disk'. When this occurs, it is simply a matter of inserting the correct side of a disk into your drive. This provides one very good reason for keeping a map of the adventure — you don't want to change disks just to return to an area you have just finished exploring.

Graphics are colourful and detailed and although they can be switched off, you'd be missing out if you choose this option. Another nice touch to the game is the inclusion of three arcade which are encountered in Dragonworld. A facility is provided enabling you to practise these without effecting your quest.

An intriguing storyline, superb graphics and attention to detail make Dragonworld an absorbing challenge.

Fast loader: N/A
Graphics: *****
Sound: ****
Playability: *****
CCI Rating: *****
Price: £19.95 (disk)
Company: Trillium, distributed by WHS Distributors, St John's House, East Street, Leicester LE1. Tel: 0533-551196

VOODOO CASTLE

VIC 20 owners do have something to look for in the adventure market with some of the earliest games written, including this 1981 Scott Adams production.

Actually written by Alexis Adams, Voodoo Castle is all text. Commands are very simple for the most part, understandably so considering the age of this particular game. But it is worth looking at for teen-aged first timers who can cope with the typing but don't want to bother with complex sentences quite yet. Only one or two word commands are allowed and the help key doesn't give much of it. Also, when most games created recently immediately give you a description of any new location, Voodoo Castle requires you to type "look" or just the letter "l" when you have moved.

Available in cartridge form, descriptions are virtually non-existent and even the accompanying manual offers only a scant, vague paragraph to explain the goal with no attempt to create an atmosphere. The saving grace in that sense is that there are plenty of little surprises such as jail cells, animal heads and exploding test tubes to keep the game lively.

Despite the lack of atmospheric description, the manual is very good for first timers with its complete instructions on playing adventures and making maps, that little hint that can save the dedicated adventurer hours of time-wasting. It also helps fill the gaps in your imagination that would otherwise be aided by graphics.

Despite the scarcity of any sort of vivid description, Voodoo Castle manages to keep you clicking right along on that keyboard.

Fast loader: N/A
Graphics: N/A
Sound: N/A
Playability: ***
CCI Rating: ***
Price: £4.99 (if you can hang on until April, the price is being reduced to £1.99
Company: Scott Adams Productions distributed by Commodore UK, 1 Hunters Lane, Weldon, Corby, Hants NN17 1QX. Tel: 0536-205252

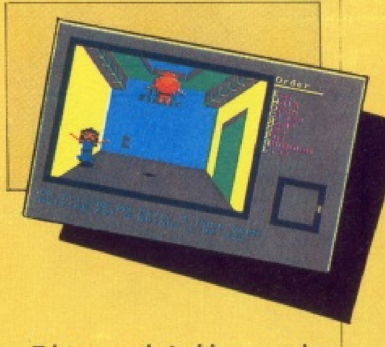
TRISTAN AND ISOLDE

A Medieval sounding flute serenades your way into this elementary adventure based on the legend of the honourable knight, Tristan, who must rescue the lovely Isolde from the claws of the evil Wumper.

One must first be warned, since the packaging gives no indication of this, that Tristan and Isolde is (we hope) aimed at a very young audience, although the difficulty of avoiding the horrible Wumper might belie that.

Commands are very simplified. Instead of typing instructions into the computer, the game actually lists a choice of commands. When you choose one, you get another, more specific list. For example, "Get" might give you a choice of "Shoes," "Candelabra," etc.

All the while, however, you must get out of a very small room using commands such as right, left, up or down. But these are not as simple as they sound because the perspective is not quite right, so a command to go right takes you in a seemingly diagonal direction. Worse yet, if you dally too long trying to figure it out, you'll be devoured by the Wumper.



Tristan and Isolde may be quite nice for the younger set, but an experienced adventurer would tire quickly of the tediousness and lack of great intellectual challenge. Unfortunately, inadequate labeling hinders the mums out there from identifying this game as potential for their little ones.

Fast loader: Yes
Graphics: **
Sound: *
Playability: **
CCI Rating: **
Price: £8.95 cassette
Company: CRL Group, 9 Kings Yard, Carpenter's Road, London E15 2HD. Tel: 01-533 2918

SCOTT

THE SUPERHEROES

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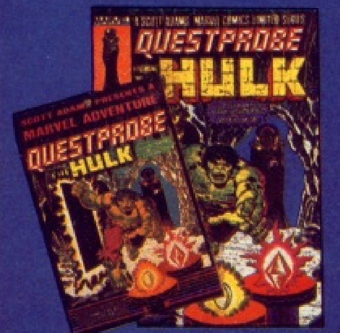

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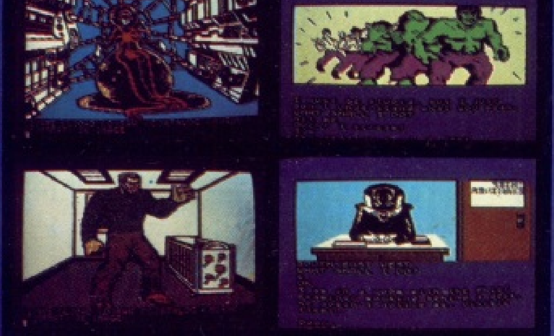

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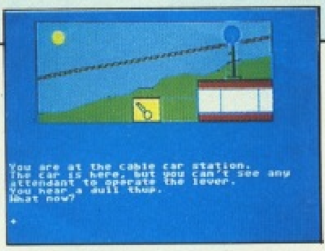
Valkyrie 17 — back in action

Introducing our regular Game of the Month page is adventure Valkyrie 17. Each month a different game will come under the scrutiny of members of our CCI Readers Panel. Read on to see how Valkyrie 17 fared ...

Valkyrie 17, from the Ram Jam Corporation, is available on cassette for the 64. At £9.99, it comes complete with MI5 style dossier and a Valkyrie 17 metal badge. On the reverse side of the cassette are several answerphone messages informing you that Valkyrie 17, a Nazi beam weapon, is active again.

Taking on the role of a secret agent, your task is to stop its re-use. All you have to go on is a dossier pieced together from various documents on the activities of Valkyrie 17. The movements of three Germans lead you to the Glitz hotel, which is where you start your investigations...



```
You are at the cable car station.
The car is here, but you can't see any
attendant to operate the lever.
You hear a dull thup.
What now?
```

"Mysterious, intriguing and ingenius are three words applicable to most adventure games, but they are especially relevant to Valkyrie 17 — a well-constructed spy drama," says K Exley (29) of Stourton, Leeds.

"My first impression was a good one," says Cpl T Ruckwood (21) of RAF Bishops Court, BFPO 801. "After a speedy two minute 50 second loading session and many hours of rewarding play, my second impression was brilliant.

"This adventure is well thought out with the player in mind, unlike other adventures, and with a little thought all of the problems set can be tackled."

"The program is written with a really good sense of humour," says Elizabeth O'Brien (34) of Madeley, Cheshire. " This shows through from the offset as you are asked if you are using a pirate copy. Answering 'yes' exits the program leaving you with just a 'ready' prompt sickly thinking 'Oh well, at least it's Turbo loading,' but as you press a key the program returns.

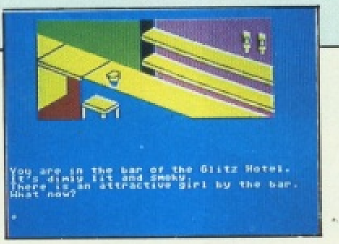
"This also happens if really naughty language is used whilst playing. The first time is just a warning, the second time is for real — so watch your language!"

Craig Pemberton (14) of Netherton, Merseyside also encountered humour: "I tried to put on a pair of skis while still wearing snowshoes and was asked if I would like to try the Ram Jam quadruped adventure for people with four feet!"

"The adventure presents some good, but simple hi-res graphics, lots of locations and 'Hobbit style language'," says R Penfold (28) of Bitterne, Southampton. "You may talk to people and commands are not restricted to noun and verb.

"While on the topic of language, a slightly annoying point is that short form commands, eg N,S,E,W etc, are limited to directions. You have to type 'look,' 'redescribe' and 'take' in full — somewhat time-consuming, but not insurmountable."

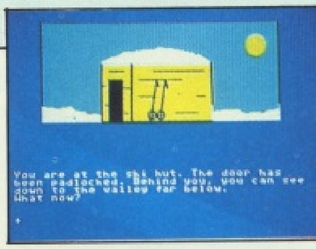
"There are over 100 graphic and text locations, many of them deadly," says Elizabeth O'Brien. "As with most adventure games some of the locations are only opened up to you if you have been all over first collecting objects. As usual you may only carry a few objects at a time.



```
You are in the bar of the Glitz Hotel.
It's dimly lit and smoky.
There is an attractive girl by the bar.
What now?
```

"As well as being told what objects you can see in a location, some of the graphic locations hold clues or objects so study them carefully."

"Overall the program is excellent," says David Cooper (17) of Northwich, Cheshire. "However it has a few annoying features. Sometimes it says that you cannot do an action, when what it really means is that it does not understand you. For example, if you type 'open can' the response is 'you can't,' but if you type 'drink can,' then the operation is carried out."



```
You are at the ski hut. The door has
been padlocked. Behind you, you can see
down to the valley far below.
What now?
```

Our panels conclusions:

"A maddeningly frustrating game, but very good fun and definitely an adventure game worth buying," — Elizabeth O'Brien.

"I found Valkyrie taxing enough to present a challenge, but not too difficult. If you're tired of Goblins, Witches and super-heroes, try this one for size," — Craig Pemberton.

"Very good, if not excellent, but not a classic. I would buy it," — David Cooper.

"This adventure most of all is good fun and value for money," — R Penfold.

"It is rewarding to progress through the colourful graphic scenes and try to match the ingenuity of its creator," — K Exley.

"After threatening phone calls, being eaten by piranha fish and sinking in snow drifts, I wondered why I kept having just one more try. The answer to my question is to be found in the games graphics, sound and humourous messages that help to make Valkyrie 17 one of the best adventures available for the 64.

"The packaging boasts a 'Fun Factor' of eight, but if not a printing error the Ram Jam Corporation have underestimated their own ability, as in my books this game deserves at least a 10," — Cpl T Ruckwood.

Contact: Ram Jam Corporation, distributed by Palace Software, 275 Pentonville Road, London N1. Tel: 01-278 0751.

FREE disk drive and £££'s of software

Fahrenheit 451

This month we are giving away a FREE disk drive and games from the exciting new Trillium science fiction series and the Windham Classics. You won't need to have played the game before but you will need a logical brain.

All the clues you will need are included below, in addition to the base map which will help you to piece together your journey. The first correct entry to reach us will receive the top prize of a disk drive plus a Trillium and a Windham Classic game, to be selected by the winner. Nine runners up will each receive one Trillium title and one Windham Classic of their own choice. The Trillium series includes advanced interactive science fiction games produced in collaboration with famous authors, such as Arthur C Clarke — Rendezvous with RAMA, and Alan Dean Foster — ShadowKeep. Each game occupies at least two disks.

The Puzzle

The computer game, Fahrenheit 451, is a sequel to the famous novel by Ray Bradbury. Guy Montag, the renegade Fireman with a passion for literature must battle to restore freedom to read to a bookless world.

In the puzzle, you are Guy Montag, and your task is to find Clarisse, who will assist you in your fight. You must beware of the establishment's mechanical hounds which mean instant death. For this reason you cautiously move around New York (travelling above the ground and below the ground).

Name: Montag, Guy

Date: Year 2030; Month August; Time 7.30am

FAHRENHEIT 451

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ALL RIGHTS RESERVED
Press 'C' to start game

Place: New York

Your task is to find Clarisse in the shortest possible time. It takes five minutes to move one square on the map. (You cannot move diagonally). You are in Central Park, next to a Lake. There is a path leading North, and nearby there is a pile of leaves:

CLUES:

1) Under the leaves you find an iron grate, you lift the grate to find a ladder which leads down into a tunnel. You climb down, the tunnel leads North and South. To the South, the tunnel seems endless, to the North there is an exit, up a ladder into a small plaza.

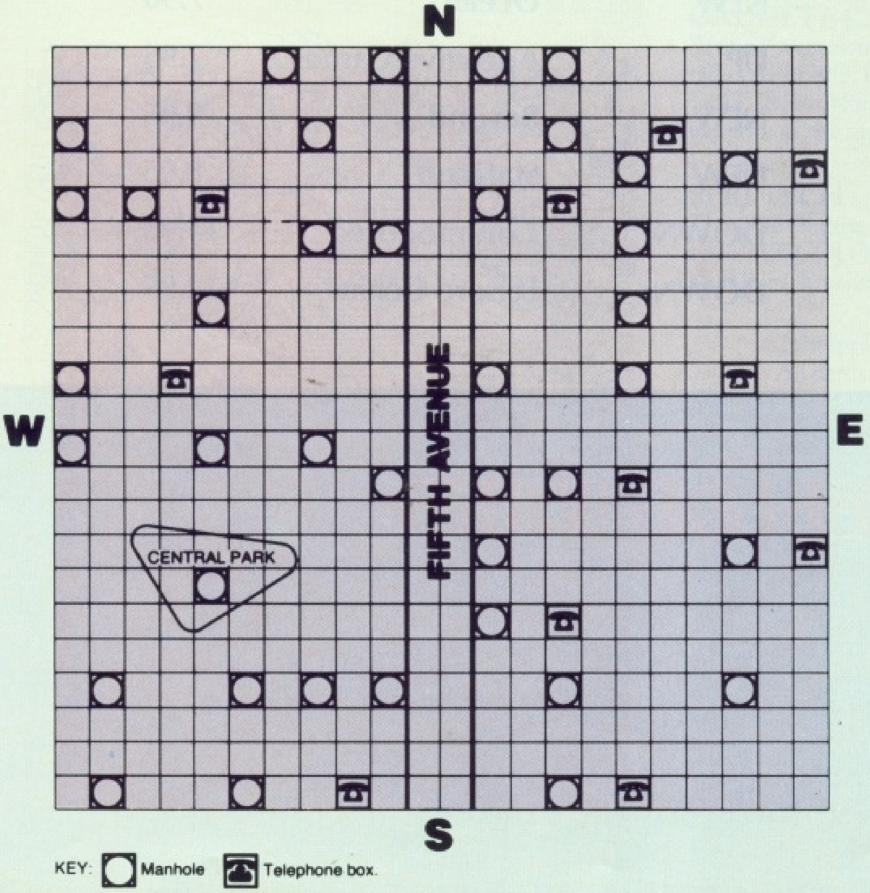
2) At 9.40 hours, you surface from a manhole and walk East until you find a phone box.

3) You never travel for more than 15 minutes above ground.

4) The telephone instructions say "you'll find Clarisse 10 minutes due North"

5) The longest tunnel took 35 minutes

Indicate shortest route on map below



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Titles — please tick the games of your choice: one Trillium title and one Windham Classic.

Trillium Titles:

Fahrenheit 451 ☐
Amazon ☐
Dragonworld ☐
Rendezvous with RAMA ☐

Windham Classics

Below the Root ☐
Swiss Family Robinson ☐

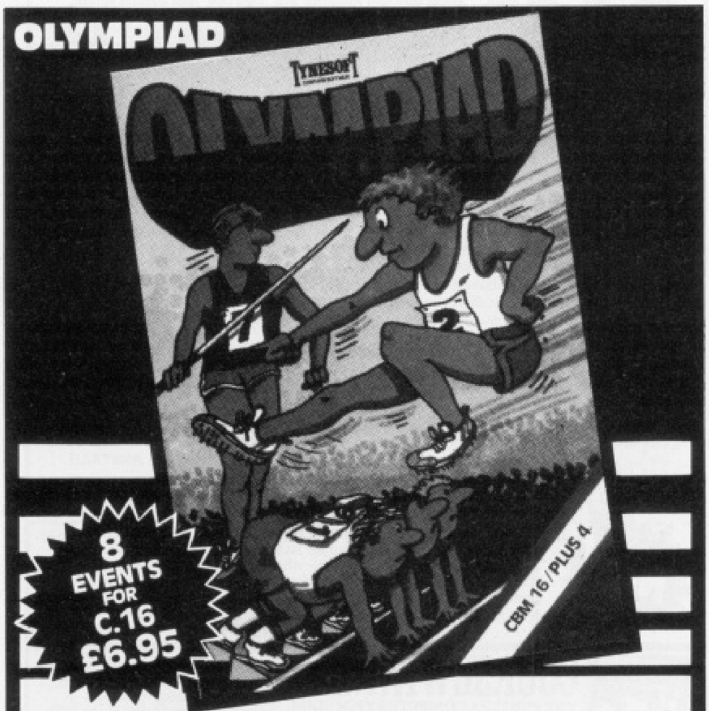
TOP TWENTY

	GAME TITLE	CHANGE	COMPANY	PRICE (£)
1	Ghostbusters	NONE	Activision	10.99
2	Hunchback II	UP	Ocean	7.95
3	Daley Thompson's Decathlon	DOWN	Ocean	7.90
4	Staff of Karnath	UP	Ultimate	9.95
5	Kong Strikes Back	UP	Ocean	7.99
6	Chiller	DOWN	Mastertronic	1.99
7	Raid Over Moscow	DOWN	Access/US Gold	9.99
8	Booty	NEW	Firebird	2.50
9	Block Busters	NEW	Macsen	7.95
10	Cadcam Warrior	NEW	Taskset	9.95
11	BMX Racers	UP	Mastertronic	1.99
12	Manic Miner	NEW	Software Projects	5.95
13	Tapper	NEW	Sega/US Gold	9.95
14	Select 1	DOWN	Computer Records	12.95
15	Kong 2	NEW	Ocean	7.90
16	Football Manager	UP	Addictive Games	7.95
17	Spy v Spy	NEW	Beyond	9.95
18	Frak	NEW	Statesoft	8.95
19	International Football	DOWN	Commodore	14.95
20	Scrabble	DOWN	Leisure Genius	12.95

BUBBLING UNDER

Fighter Pilot	Digital Integration	9.95
Lords of Midnight	Beyond	9.95
Impossible Mission	Epic	8.95

Compiled by CCI from leading distributors



OTHER TITLES AVAILABLE FOR THE C.16 – RIG ATTACK £6.95 – LUNAR DOCKING £6.95 – ZAP-EM £6.95. C.16 SOFTWARE STARTER PACK CONTAINING SHOOT-IT, HOPP-IT, CLIMB-IT, MUNCH-IT – £14.95. AVAILABLE BY MAIL DIRECT FROM TYNESOFT – JUST SEND REMITTANCE – POST AND PACKING FREE.
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COLOSSAL CAVE ADVENTURE

by Peter Gerrard

The original and best mainframe adventure, now available for the Amstrad and Commodore 64. Unlike other versions, this game follows the original layout, complete with all the infuriating traps and bewildering mazes, not to mention the Troll, the Dragon, the Pirate or the mysterious shadowy figure. You can't call yourself an adventurer until you have conquered this mammoth quest! As a concession to the faint-hearted, you are allowed to resurrect yourself twice. £7.95

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by John D. Ryan

This devious adventure for the Commodore 64 is set in a long-lost palace in a distant land. You have heard rumours of the vast wealth to be gained by anyone brave enough to enter the palace. Unfortunately, the task turns out to be more difficult than you imagined, as the palace has some sinister inhabitants. Even the palace seems to have a mind of its own! There is an option to save your progress on tape at any time. £7.95

CASTLE DRACULA

by Ray Davies

Available for the Amstrad, BBC 32K and the Commodore 64, this game starts in a deserted village, overshadowed by Dracula's sinister castle. Your mission is to enter the castle and serve His Putrescence a well prepared stake. There are many useful objects to be found along the way, and from time to time the program can be persuaded to give you hints. There are 100 locations to explore and you have the option to save your progress on tape at any time. £7.95

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Access VISA

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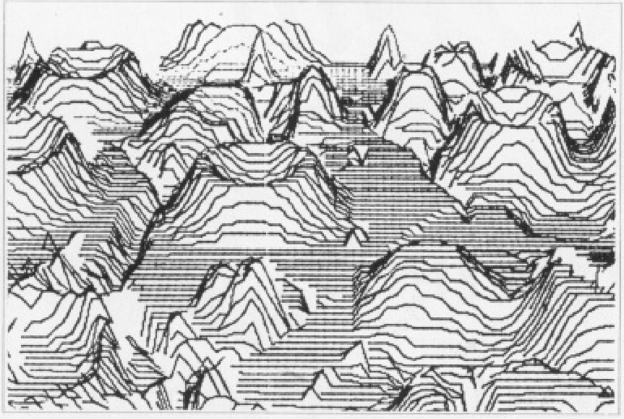
MOONRAKER



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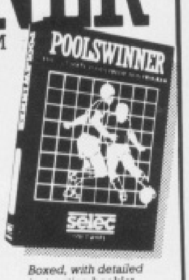

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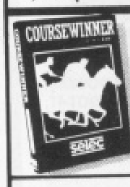

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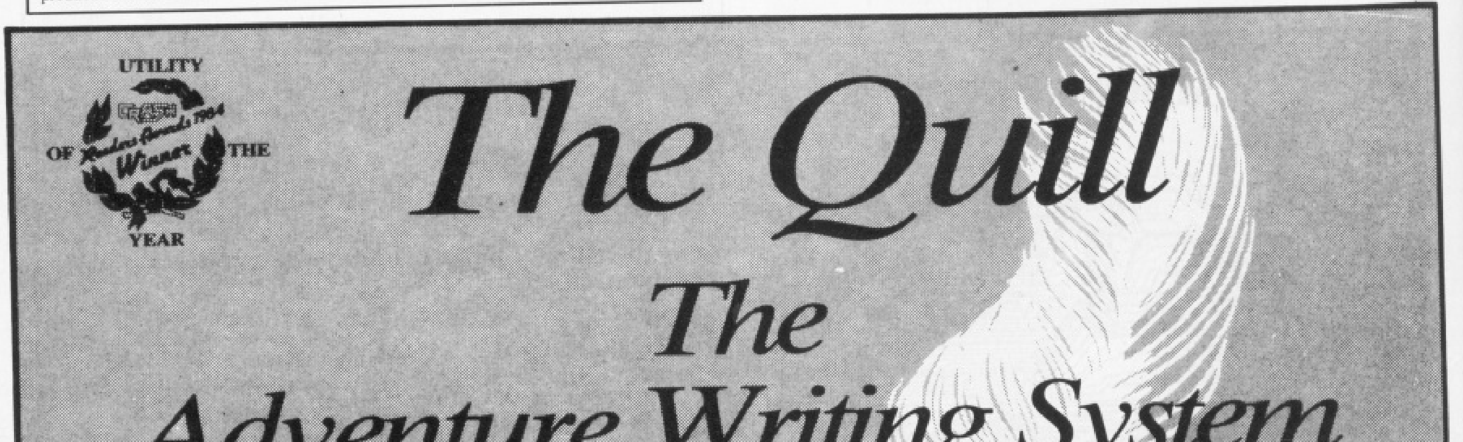

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Boris the brave

VIC owners, we still consider you! And to prove it here's another listing for your perusal. It's an arcade game called Boris written by Richard Ikin.

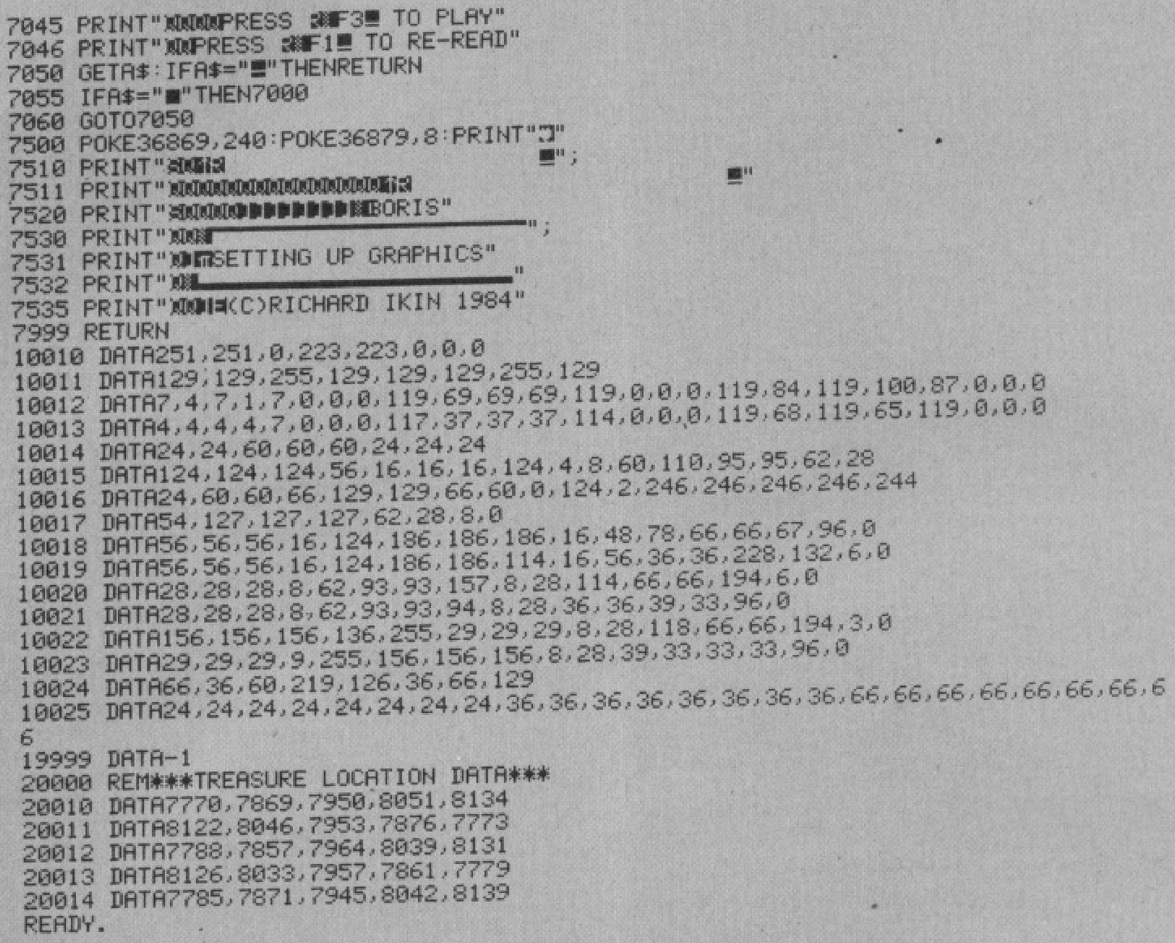
The object of this game is to help Boris tidy up five chambers by guiding him around with a joystick, around the platforms and up ladders. Look out for the aliens!

```
10 POKE43,1:POKE44,32:POKE8192,0
20 POKE641,0:POKE642,32
30 POKE648,30:POKE36866,150
40 POKE36869,240
50 PRINT"■PLEASE WAIT...";
60 POKE631,76:POKE632,111:POKE633,13
70 POKE198,7:NEW
READY.
```

```
1 GOSUB6000:GOSUB7000:GOSUB7500
4 POKE37151,0:PA=37151:PB=37152:RB=37154
5 DIMTL%(25),D%(5),AS%(5),AL%(5)
6 LE=1:L=3:SC=0:S$="000000":L$="HHH"
7 D%(1)=-22:D%(2)=22:D%(3)=1:D%(4)=-1:D%(5)=0
8 AS%(1)=8108:AS%(2)=8024:AS%(3)=7930:AS%(4)=7849:AS%(5)=7759
10 FORJ=0TO511:X=PEEK(32768+J):POKE7168+J,X:NEXT
11 FORJ=0TO511:READCH:IFCH<0THEN13
12 POKE7168+J,CH:NEXT
13 POKE36869,255
14 FORX=1TO25:READTR:LETTL%(X)=TR:NEXT
15 PRINT"■":POKE36879,8:POKE650,128:POKE36878,15
16 CO=30720:PL=7790:U=0
20 FORQ=PLTOPL+21:POKEQ,0:POKEQ+CO,5:NEXT
21 PL=PL+88:IFPL>8164THEN24
22 GOTO20
24 GOSUB500
25 PRINT"▚■BCD▜ 000000   ■EFG ▜"
27 GOSUB800:GOSUB850
28 M=8120:U=0:GOSUB600
29 POKEM,15:POKEM-22,14:POKEM+CO,1:POKEM-22+CO,1
100 GOSUB1000
105 GOSUB3500
110 A=PEEK(PA):POKERB,127:B=PEEK(PB):POKERB,255
111 IF(BAND128)=0THENGOSUB2000
112 IF(AAND16)=0THENGOSUB2100
113 IF(AAND4)=0THENGOSUB2200
114 IF(AAND8)=0THENGOSUB2300
119 IFU=LE*5THENGOTO3000
199 GOTO100
500 FORQ=8070TO8136STEP22:POKEQ,1:POKEQ+CO,4:NEXT
501 FORQ=7799TO7865STEP22:POKEQ,1:POKEQ+CO,4:NEXT
502 FORQ=7895TO7961STEP22:POKEQ,1:POKEQ+CO,4:NEXT
503 FORQ=7970TO8036STEP22:POKEQ,1:POKEQ+CO,4:NEXT
504 RETURN
600 FORQ=1TOLE*5
601 TT=8+INT(1+5*RND(0))
602 IFTT=9THENTC=4
603 IFTT=10THENTC=5
```

```
604 IFTT=11THENTC=7
605 IFTT=12THENTC=6
606 IFTT=13THENTC=2
610 POKETL%(Q),TT
611 POKETL%(Q)+CO,TC
612 NEXT
613 RETURN
800 IFSC=>1000000THENSC=0
801 SC$=STR$(SC)
802 IFSC>99999THENS$=STR$(SC):TA=3:GOTO810
803 LS=LEN(SC$)
804 S1$=RIGHT$(SC$,LS-1)
805 S$=LEFT$(S$,6-LS)+S1$
806 TA=5
810 PRINT"■"TAB(TA);S$
815 POKE36875,INT(RND(0)*128)+127:FORT=1TO10:NEXT:POKE36875,0
850 PRINT"■■■■■■■■■■■■■■■■■■■■■      ■■■■■■";LEFT$(L$,L-1)
859 RETURN
1000 FORAA=1TO5
1005 DD=INT(1+5*RND(0))
1007 IFPEEK(AS%(AA)+D%(DD))<>32THENDD=5
1010 POKEAS%(AA)+D%(DD),26:POKEAS%(AA)+D%(DD)+CO,7
1011 AL%(AA)=AS%(AA)+D%(DD)
1015 NEXT
1020 FORT=1TO75:NEXT
1030 FOREE=1TO5:POKEAL%(EE),32:NEXT
1099 RETURN
2000 IFPEEK(M-44)=1ANDPEEK(M-45)=0THENRETURN
2002 IFPEEK(M-21)=0ORPEEK(M+1)=0ANDPEEK(M+22)=1THENRETURN
2010 IFPEEK(M-45)=1THENPOKEM-1,1:POKEM-1+CO,4:POKEM-23,1:POKEM-23+CO,4
2050 M=M+1:POKEM-1,32:POKEM-23,32
2055 IFPEEK(M)=0THENM=M-22
2060 IFPEEK(M+1)>8ANDPEEK(M+1)<14THENSC=SC+(5*(PEEK(M+1)))*LE:U=U+1:GOSUB800:POK
EM+1,32
2090 POKEM,15:POKEM-22,14:POKEM+CO,1:POKEM-22+CO,1
2091 FORT=1TO20:NEXT
2092 POKEM,17:POKEM-22,16:POKEM+CO,1:POKEM-22+CO,1
2099 RETURN
2100 IFPEEK(M-44)=1ANDPEEK(M-45)=0THENRETURN
2102 IFPEEK(M-23)=0ORPEEK(M-1)=0THENRETURN
2110 IFPEEK(M-43)=1THENPOKEM+1,1:POKEM+1+CO,4:POKEM-21,1:POKEM-21+CO,4
2150 M=M-1:POKEM+1,32:POKEM-21,32
2152 IFM=7767THENM=7789
2155 IFPEEK(M-44)=0THENM=M+22
2160 IFPEEK(M-1)>8ANDPEEK(M-1)<14THENSC=SC+(5*(PEEK(M-1)))*LE:U=U+1:GOSUB800:POK
EM-1,32
2190 POKEM,19:POKEM-22,18:POKEM+CO,1:POKEM-22+CO,1
2191 FORT=1TO50:NEXT
2192 POKEM,21:POKEM-22,20:POKEM+CO,1:POKEM-22+CO,1
2199 RETURN
2200 REM
2205 IFM<7790THENRETURN
2206 IFPEEK(M-66)=0THENRETURN
2250 M=M-22:POKEM+22,1:POKEM+22+CO,4
2290 POKEM,23:POKEM+CO,1:POKEM-22,22:POKEM-22+CO,1
2291 FORT=1TO50:NEXT
2292 POKEM,25:POKEM+CO,1:POKEM-22,24:POKEM-22+CO,1
2299 RETURN
2300 REM
2305 IFPEEK(M+21)=0ANDPEEK(M+22)<>1THENRETURN
2306 IFPEEK(M+22)=0THENRETURN
2340 M=M+22:POKEM-44,32
2350 IFPEEK(M-45)=0THENPOKEM-44,1:POKEM-44+CO,4
2355 IFPEEK(M-67)=0THENPOKEM-44,1:POKEM-44+CO,4
2390 POKEM,23:POKEM+CO,1:POKEM-22,22:POKEM-22+CO,1
2391 FORT=1TO50:NEXT
2392 POKEM,25:POKEM+CO,1:POKEM-22,24:POKEM-22+CO,1
2399 RETURN
3000 C=0
3001 FORLC=1TO(LE*5)
3002 IFPEEK(TL%(LC))=32THENC=C+1
3003 NEXTLC
3004 IFC=25THEN3010
3005 IFC=LE*5THENLE=LE+1:POKEM,32:POKEM-22,32:SS=SC:SC=SC+(LE*10):GOSUB3100:GOTO
28
3010 SC=SC+(LE*100):GOSUB3100:LE=1:POKEM,32:POKEM-22,32:GOTO28
```

```
3100 GOSUB800
3110 FORV=15TO0STEP-3
3120 POKE36878,V
3130 FORS=255TO128STEP-9
3140 POKE36876,S
3150 NEXTS,V
3160 POKE36876,0:POKE36878,15:RETURN
3300 DE=27
3301 FORT=1TO5:POKEM,DE:POKEM+CO,2:POKEM-22,DE:POKEM-22+CO,2:POKE36877,220:NEXT
3302 DE=DE+1:IFDE=30THENPOKE36877,0:GOTO3310
3303 GOTO3301
3310 L=L-1:IFL=0THENGOTO5000
3315 GOSUB850
3320 POKEM,32:POKEM-22,32:GOTO28
3500 FORQQ=1TO5
3510 IFM-22=AL%(QQ)THEN3300
3520 IFM-44=AL%(QQ)THEN3300
3530 IFM-21=AL%(QQ)THEN3300
3540 IFM-23=AL%(QQ)THEN3300
3550 NEXT
3599 RETURN
5000 POKE36879,8:FORQ=7702TO8185:POKEQ,32:NEXT
5010 X$="▒▒▒▒████▒▒BAD LUCK!!!!YOU   HAVE USED UP ALL YOUR LIVES"
5011 GOSUB5400
5020 X$="▒▒▒BETTER LUCK NEXT TIME!"
5021 GOSUB5400
5025 X$="▒▒▒▒▒▒████DO YOU WANT ANOTHER GAME?(Y/N)"
5026 GOSUB5400
5050 GETA$:IFA$="Y"THENRUN
5055 IFA$="N"THENPOKE36869,240:POKE36879,27:PRINT"▒▒":END
5060 GOTO5050
5399 END
5400 Y=LEN(X$)
5410 FORJJ=1TOY
5420 Y$=MID$(X$,JJ,1)
5430 PRINTY$;:POKE36875,220:FORT=1TO25:NEXT:POKE36875,0:NEXT
5450 RETURN
6000 PRINT"▒":POKE36879,8:POKE36869,240
6010 PRINT"▒█▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒
▒";
6020 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒";
6021 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒
▒";
6030 PRINT"▒▒▒▒▒▒██████████▒BORIS"
6031 PRINT"▒▒▒▒█████▒CBM VIC-20+8K"
6040 PRINT"▒▒▒(C) RICHARD IKIN 1984"
6080 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒██▒PRESS ▒█ SPACE █"
6090 GETA$
6095 IFA$=" "THENPRINT"▒SETTING UP GRAPHICS..":RETURN
6099 GOTO6090
7000 PRINT"▒":POKE36869,240:POKE36879,25
7010 PRINT"▒"SPC(8)"▒BORIS▒██████▒──────"
7020 PRINT"▒▒▒←WELCOME!!."
7021 PRINT"▒████THE OBJECT OF THISGAME IS HELP BORIS TO TIDY UP THE 5 CHAMBERS";
7022 PRINT"BY GUIDING HIM ROUND  WITH YOUR JOYSTICK     ALONG THE PLATFORMS   AND
 UP ";
7023 PRINT"THE LADDERS.   HOWEVER,LIFE IS NOT A BED OF ROSES."
7024 PRINT"▒▒▒PRESS ▒█F1█"
7025 GETA$:IFA$="█"THEN7030
7026 GOTO7025
7030 PRINT"▒▒"SPC(8)"▒BORIS▒██████▒──────"
7031 PRINT"▒▒▒███←HOVERING AROUND THEPLATFORMS ARE SOME     VERY UNFRIENDLY ALIEN
SWHO ";
7032 PRINT"WILL DISINTIGRATE YOU ON CONTACT!"
7033 PRINT"████YOU WILL HAVE TO  AVOID THESE TO PICK UPALL THE ITEMS"
7034 PRINT"████THERE ARE FIVE LEVELS TO GO THROUGH AND YOU HAVE THREE LIVES  (GE
NEROUS";
7035 PRINT" ARE'NT I?!)
7036 PRINT"▒▒PRESS ▒█F1█"
7037 GETA$:IFA$="█"THEN7040
7038 GOTO7037
7040 PRINT"▒▒"SPC(8)"▒BORIS▒██████▒──────"
7041 PRINT"▒▒▒███←ONCE YOU HAVE CLEARED ALL FIVE LEVELS BORIS WILL HAVE TO STAR
T";
7042 PRINT"WORK OVER AGAIN UNTIL THERE ARE NO LIVES    LEFT"
```



```
7045 PRINT"■■■PRESS ■■F3■ TO PLAY"
7046 PRINT"■■PRESS ■■F1■ TO RE-READ"
7050 GETA$:IFA$="■"THENRETURN
7055 IFA$="■"THEN7000
7060 GOTO7050
7500 POKE36869,240:POKE36879,8:PRINT"■"
7510 PRINT"■■■                                      ■";
7511 PRINT"■■■■■■■■■■■■■■■■■■■                                     ■"
7520 PRINT"■■■■■■▶▶▶▶▶▶▶▶▶▶■BORIS"
7530 PRINT"■■■━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━";
7531 PRINT"■■■SETTING UP GRAPHICS"
7532 PRINT"■■━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━"
7535 PRINT"■■■■(C)RICHARD IKIN 1984"
7999 RETURN
10010 DATA251,251,0,223,223,0,0,0
10011 DATA129;129,255,129,129,129,255,129
10012 DATA7,4,7,1,7,0,0,0,119,69,69,69,119,0,0,0,119,84,119,100,87,0,0,0
10013 DATA4,4,4,4,7,0,0,0,117,37,37,37,114,0,0,0,119,68,119,65,119,0,0,0
10014 DATA24,24,60,60,60,24,24,24
10015 DATA124,124,124,56,16,16,16,124,4,8,60,110,95,95,62,28
10016 DATA24,60,60,66,129,129,66,60,0,124,2,246,246,246,246,244
10017 DATA54,127,127,127,62,28,8,0
10018 DATA56,56,56,16,124,186,186,186,16,48,78,66,66,67,96,0
10019 DATA56,56,56,16,124,186,186,114,16,56,36,36,228,132,6,0
10020 DATA28,28,28,8,62,93,93,157,8,28,114,66,66,194,6,0
10021 DATA28,28,28,8,62,93,93,94,8,28,36,36,39,33,96,0
10022 DATA156,156,156,136,255,29,29,29,8,28,118,66,66,194,3,0
10023 DATA29,29,29,9,255,156,156,156,8,28,39,33,33,33,96,0
10024 DATA66,36,60,219,126,36,66,129
10025 DATA24,24,24,24,24,24,24,24,36,36,36,36,36,36,36,36,66,66,66,66,66,66,66,6
6
19999 DATA-1
20000 REM***TREASURE LOCATION DATA***
20010 DATA7770,7869,7950,8051,8134
20011 DATA8122,8046,7953,7876,7773
20012 DATA7788,7857,7964,8039,8131
20013 DATA8126,8033,7957,7861,7779
20014 DATA7785,7871,7945,8042,8139
READY.
```

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Avoid the danger zone — check for validity

Continuing our look at programming errors, David Bowdrey warns against the perils of errors of omission — leaving things to chance

ERRORS OF OMISSION

This area of programming is that danger zone into which we are drawn when we start leaving things to chance. When we fail to check for validity, for whatever reason, then the errors of omission creep in. Don't trust to luck, ensure that your program keeps positive control at all times.

BOUNDS

Errors in this family are those that result in the computer grinding to a halt with a bland error message which often belies the lost processing effort preceding the unscheduled stop, or those that leave the user unable to take the program beyond a given input point. In keeping with the normal pattern, errors in this family fall into two groups. One relates to the quality of the data being processed by the program, their validity and correctness. The other relates to the use of numbers and their suitability for their intended use.

Data Quality

The first aspect of data handling must be to ensure that they are valid. All the subsequent manipulation counts for nothing when the initial data are wrong. It is imperative that the programmer actively ensures that the data which the program is manipulating are the right data. When making checks for validity it is important to bear in mind the exceptions within the class of data being checked. For example, limiting names to those strings whose components are within hyphens, apostrophies or spaces. The user could well be unable to enter his name! It is necessary to define fully the range of any data to be checked with all exceptions carefully considered.

Suitable error reports from within the program should be made to the user on receipt of any unsatisfactory data. Incidently, a block of data within the prescribed bounds is not necessarily correct. For example, an address of 21 Orchard Drive is equally valid as an address of 12 Orchard Drive, whereas either one may be a wrong address in relation to a delivery schedule. Cross correlation between the various blocks of a multipart program is an effective way of checking that, say, a customer exists. Such correlation checks are only valid so long as each block draws its data from independent sources, eg. keyboard for one and disk file for the other.

When manipulating data it is all to easy to access the wrong data field. The result can be costly where the wrongly accessed data are plausible. The solution is twofold. First organise the data storage, be it file or array, in a uniform and orderly way. Secondly, arrange for data fields to start with, or have, a unique signature which can be discarded if necessary. An address filing system could allow fields for house names and for house numbers. Whilst many of the addresses filed will not require the house name field, the presence of the extra field will lessen the dangers of any data confusion. Similarly, the entries in fields of an address book file could be padded to a unique field length with, say, shifted spaces. At each access the length of the entry could be checked as confirmation of the field.

Numeric Type

When handling numbers for printed output the question of size (the number of digits in the number) raises its head. Having planned the range of numbers that the program is to handle, the program should still include checks to ensure that keyboard input or the results of any calculation are within the size allocated for display of the result. Attempts to print 1000 to field allocation of up to 999 may give the printer indigestion.

With a known formula, as encoded in the BASIC, it is a relatively simple process to determine the range of legal inputs which give outputs within the preset range and then to code to check that they are not exceeded. The other approach is to indentify the out of range figures and to replace them with some symbol indicating to the program user that the result is not able to be displayed by the program. For example, printing *** is certainly more preferable than allowing the computer to truncate £1027.00 to £27.00! After all, the real value should still be held in the computer and form part of the final tally.

The other complication which can arise is that of the computer giving the result in an exponential form. Again a simple check within the code is certainly preferable to attempting to process the likes of 1.23456789E02 into a four figure format printout.

Keyboard input used in a calculation has to be treated with the utmost caution. Not only must the number be in the range relevant to the particular element of the formula, for which checks must be made, but it must also be displayed in the form that it will be employed in the formula for the user to see. The use of wrong, yet legal, numbers in a complex formula can lead to unmitigated disasters. The user must be given the chance to reject a set of figures to be used in any calculation the result of which may have serious implications.

Too often programs take keyboard input, perform calculations and produce results without so much as a hint as to how the result was obtained or a reflection of the figures used. It is important that the code checks to ensure nonsense values for the particular formula have not been entered, echoes the numbers on the screen, and allows for the user to reject the numbers entered (or abort the process).

Several errors may arise in making assumptions when using FOR/NEXT loops. Where the parameters of the count are calculated, eg. FOR C = A TO B STEP S, the checks should be encoded to ensure that all such calculated variables are acceptable. Remember that a loop will be executed at least once, so relying on setting the variables to zero will not prevent its execution. The choice of the STEP value can lead to program corruption. A calculation variable which sets the STEP to zero, or near zero, will trap the program in an endless, or near endless, loop. Once the loop control variables have been declared then they remain set until the loop is terminated. Subsequent redeclaration of the control variables within the loop has no effect. Setting the count variable to any number greater than the control end variable is the only effective way to end FOR/NEXT loop without working through each step. Whilst the NEXT will function without the count variable being declared, it is an effective way of managing a program to attach the count variable to the NEXT, eg. NEXTC.

The grand omission where numbers are concerned is that which results in an attempted division by zero. Whenever an equation has a variable as a divisor it is essential for the continued health of the program to encode a check that the variable is non-zero before the evaluation of the equation.

In conclusion, the failure to set the bounds for data in general and numbers in particular can lead to all sorts of peculiar program errors. Good programming practice requires the definition of each area of the program before writing a single line of code. Having taken the trouble to define the data it is only sensible to include the appropriate checks in the code to ensure that the definitions are upheld.

ASSUMPTIONS

Throughout life we continually make assumptions about the world in which we live. Such assumptions are quite rational in a flexible world where change is the norm. A false assumption, once observed, is replaced by another assumption vested with the experience which unseated the previous assumption. Unfortunately, the world of the computer program is far from flexible. It becomes essential to assume that nothing can be assumed! There are two danger areas of false assumptions — one relating to people, and the other to data.

User Ability/Foibles

Without doubt the deadliest thing known to the computer program, after a machine failure, is the inexperienced/incompetent user. Just because you and your acquaintances are all computer literates with a high degree of hand/eye co-ordination, don't assume that every mortal soul is so endowed. The program should be designed to be genuinely user-friendly (a much abused phrase!). When a programmer accepts that the user of a program may have never used a computer before, or be so nervous about computers as to effectively be a first-time user, then the requirements for full prompts or comments and the need for error correction become self evident.

The classic prompt is the, "hit any key to continue." For a start, "hit" may be OK for an American user but in the UK the word hit generally has a stronger and more damaging meaning. Secondly, giving free choice as to which key to press can throw the novice completely. A keyboard shy user can become quite tense at the prospect of pressing just any key. Finally, unless steps have been taken to inhibit the key, pressing the STOP key will give the usual "break in line xxx" message. Quite traumatic for the novice! "Press the (SPACE) bar to continue" or some such clearly defined response keeps with the principle of maintaining control over the program at all times whilst guiding the novice user. Such an approach also has the advantage of applying a degree of discipline to the tearaway practiced user.

The question of prompts and comments, and their content and placing, is worthy of dissertation in its own right. The level of prompts must be such that the regular user is able to progress through the program without hindrance. Yet there must also be a hidden depth of prompts which come into view when actions by the user are inappropriate for the program at a given stage. Similarly, comments need to be appropriate to the activity and the purpose of the program.

The placing of prompts or comments should be as consistent as possible throughout the program. Use all the facilities available to the computer when designing these program messages. When an answer is wrong, change the border to red, for example. the use of a bleep when a lower level prompt has been brought into use alerts the regular user to an unusual event. It tells him to read the prompt as its not one of the regular ones.

Having come to tems with the fact that all computer users are not as competent as yourself, it is only a small step to accepting that some of them may be positively moronic! To assume that when your user-friendly program asks for a particular response the user will obediently follow the instruction is naive and often terminally fatal for the program with such assumptions enshrined within it. All programs must carefully regulate the input from the keyboard. Non-appropriate inputs can then be parried with suitable prompts or comments (caustic or otherwise!). The use of the INPUT command for keyboard entry should be excluded from any program which wishes to maintain control over its own destiny. Keyboard input should be obtained and processed using the GET A$ form of command (not GET A as it would excluded any non-numeric response, eg. the DELete key). No assumptions as to user ability need to be made and full bounds checking can be incorporated.

The control of the input allied to clear prompts overcomes the all too common assumption that we all think alike. A simple request for the entry of the date can result in one of a large number of date formats being entered. Even the entry of apparently simple numbers can be very perplexing. There are many people, one might say most people, who separate their blocks of zeros representing the thousands with commas. Such a practice is no-no with the INPUT command which uses the comma as a data separator. Any input routine should take such foibles into account.

While the control of inputs is straightforward once the need is understood, the attention to output is fraught with the dangers of assumptions. All the work of the program and the user's efforts are jeopardised if a prompt uses a piece of jargon either not known or capable of being misunderstood by the user. In general it is important to use plain English when giving user instructions particularly where activities outside the direct checking of the computer are concerned. It is valid, yet totally meaningless to the novice, to direct "switch on device 4" instead of "switch on the printer." On the same tack but from within the program, the definition of any outputs should be carefully encoded.

When printing to screen or printer the use of undefined output formats is, at best, untidy. At worst, it is down right wasteful of the programming effort and the user's time. There is little point in constructing a worthwhile program which almost casually dispenses the results of its use on a cluttered screen or in a mass of figures on a piece of paper. Because you as the programmer know that the results are printed in a particular order, it is no excuse for not labelling each result and printing them in some rational format.

Having taken great pains to ensure a right answer, don't risk its corruption by ambiguous presentation. You can safely assume that other people will make erroneous assumptions!

Data Integrity

The testing phase of program development is the stage when serious omissions are often made. The most common must be to employ test data which does not relate to the real world values which the program will be expected to handle. The consequences of such testing is that the checks incorporated to control the quality of the data being processed are not fully or appropriately exercised. A program constructed by defining the bounds at each stage in the code can be fully tested by exercising to and just beyond those bounds. A program with ill-defined limits will prove difficult to test.

The quantity of data which a program is expected to process can prove problematical where no provision for its regulation has been made. It is a simple omission, but none the less damaging to the program, to not encode and then check for end of data markers. By relying on simple counts or the computer operating system to control data flow, user or programmer error can readily result in the endless loop or a program crash. Insufficient data is a particular hazard to which the end of data marker puts an end!

Each micro has a finite RAM. It is not difficult for an active program to fill the available RAM to bursting point. It is very frustrating to have a program crash with an "out of memory" message after painstakingly working through long lists of data.

Likely memory requirements for data storage must be calculated in the early stages of program design. The actual calculation depends on the type of array declared. Declaration of numeric arrays at the start of a program will set aside the full amount of memory that the elements of the array will occupy whether they are subsequently used by the operating system. The actual memory usage does not occur until the elements of the array are declared.

A crude but effective ball park calculation is to multiply the anticipated average string array element character length by the number of elements. At the same time, the number of elements should be multiplied by the maximum element length for which the program is designed.

Where there is a very real possibility of running out of space then steps must be taken to store the processed data on tape or disk at safe intervals. At the very least a check of the free memory should be made before processing each chunk of data so that the user can be warned of the impending exhaustion of the memory.

However, good program design should take into account the probable packages of data likely to be encountered. Consideration of free memory, file access and ultimate purpose of the program will determine the maximum practical data blocks. The code should reflect these design considerations. Where machine size limitations make life difficult, eg. in sorting large amounts of data on file, then the programmer must resort to more suitable or purpose designed algorithms: multi-block partial sorting where blocks of data are sorted and then interleaved with other blocks of sorted data until the total data file is sorted; pointer sorting where the data remains static but pointers to its location are sorted into the appropriate order of merit, usually updated as each data item is encountered.

The handling of data is one of the primary activities of the computer. On the face of it the machine and its operating system seem geared to making the process straightforward. In truth there is a lot of effort expended in getting it right and there are many facets which can all too easily be overlooked. When you write a program to handle large amounts of data be sure to question every aspect of the design. Define and confine the data in a positive manner.

CONCLUSIONS

It is almost impossible to write a computer program without an error, but that is no excuse for not trying. We will all make mistakes when writing programs. To quote the old saying, a man who never made a mistake never made anything! However, by being aware of the probable errors, adopting a sound program design and coding practice, and, above all, avoiding unnecessary complexity, you can stack the odds in your favour. May your errors be little ones, and easily recognised!

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Making passes

ROM routines can be accessed for your own purposes. Mike Hart explains how to pass data to these routines and how to access internal routines

Whenever a BASIC program is run, the computer's own 'internal' systems take each part of the code and 'interpret' what is to be done with it. Essentially then, running a BASIC program entails many decisions on the part of the computer as to which of the internal routines should be activated (in 6502 machine code). The process of 'running' a program may be conceptualised as a 'stitching together' of many other sub-routines, all in machine code, which are designed to perform particular tasks.

Such tasks may be printing to the screen or performing a numerical calculation but in each case there may be several internal routines (ROM routines) which come into play to perform even a simple operation. The designers of the ROM have ensured that the various routines articulate well with each other for they have to call each other or to access error messages if information is presented to them in a way that they cannot handle (eg a division by zero error!)

Armed with a good 'memory map' of these routines, we can access them for our own purposes usually with a SYS statement. For example it is possible to reset the machine by access to a SYS routine. More often than not we wish to pass our own data to these routines or to access an internal routine that will evaluate an expression so that it will be useful for our purposes.

For example, if we wish to write a 'COMPUTED GOTO' function then we will require access to a routine that will compute numbers in the range 0-63999, whereas if a PRINT AT function is required we will need access to routines that will process two values (or parameters) which will be in the range 0-255. Examples of both of these routines will be given later.

USR vs ROM routines

The USR statement has been designed so that the results of an arithmetic expression are available for user-written machine code and it has the additional advantage that the result may be accessed subsequently when the user returns to BASIC. However, the USR function has to be 'pointed' to the start of one's own code and if one is concerned only with passing data to a routine then there are quicker and more elegant ways to do it once some familiarity with the ROM routines has been acquired.

There are some routines — particularly the POKE location, value — which have been designed to receive and evaluate data from a text line in either program or direct mode. It is possible to 'borrow' relevant parts of these routines for our purposes.

Borrowing data

When data is passed, we need to know whether data is to be passed in the form of single bytes (0-255) or double bytes (0-65535) and also whether a single value is to be passed or a pair of values. Already this gives a combination of four different cases. In addition we might also consider the case when we might wish to pass a 'mixed' pair of values in which one of the pair is a single byte whilst the other is a double byte.

In the table that follows, I present these five cases including some variations that are possible within each case. Of these I can personally see a use for two or three of them but it may well be that interested readers can think of applications for some of the others.

In many published examples of these routines, it has been conventional to publish the routine in the form:

SYS Location, Value

The CBM expression evaluator will read the location number as far as the first non-numeric character and will leave CHRGET pointing to the comma. It is then conventional to enter a single short sub-routine that will lead to SYNTAX ERROR if the CHRGET routine is not pointing to a comma and then advances the text-pointer by one place.

If, however, you include the location number in brackets, then CHRGET and the text-pointer will point to the first location after the brackets dispensing with the need for one of the subroutines. This makes the resultant code more concise.

Personally, I like machine code routines to be as 'tight' and as economical as possible. However, there are differences in programming styles and some authors would undoubtedly hold to the view that one ought to make maximum use of error checking and data validation routines where appropriate. I do not dissent from this approach in certain circumstances, but the approaches presented here might be thought of as the 'direct' approaches that call for a minimum of programming. For example, I present an example of a PRINT AT routine (for the 64) later in the article that has been condensed down to twelve bytes. If you are a 'mean-minded' programmer then you resent spending more bytes than is absolutely necessary!

Table of routines

Examples are given in the table of equivalent routines for the 64, the VIC, BASIC 2 and BASIC 4 machines. In the case of the 64 and BASIC 4 machines these routines have been checked on the relevant machines, but in the case of VIC and BASIC 2 machines I have had recourse to the published memory maps. If these are inaccurate or the CBM ROMs alter slightly between one batch of machines and the next then some may not work as intended.

CASE	SYNTAX	C-64	VIC	BASIC 2	BASIC 4	Single byte	LSB	MSB
(a) 1 single byte	SYS Location,Exp.	JSR $B7F1	JSR $D7F1	JSR $D6CC	JSR $C927	X register	-	-
(b) 1 single byte	SYS Location,Exp.	JSR $B79B	JSR $D79B	JSR $D675	JSR $C8D1	X register	-	-
(c) 1 single byte	SYS (Location) Exp.	JSR $B79E	JSR $D79E	JSR $D678	JSR $C8D4	X register	-	-
2 single bytes (e.g. PRINT AT)	SYS (Location) Exp , Exp	JSR $B7EB	JSR $D7EB	JSR $D6C6	JSR $C921	(2nd byte) X register	(1st byte) $14 C-64/VIC $11 B2/B4	
1 single byte + 1 double byte	SYS (Location) Exp , Exp	JSR $B7EB	JSR $D7EB	JSR $D6C6	JSR $C921	(single byte) X register	(double byte $14 C-64/VIC $11 B2/B4	........) $15 C-64/VIC $12 B2/B4
(a) 1 double byte	SYS (Location) Exp.	JSR $AD8A JSR $B7F7	JSR $CD8A JSR $D7F7	JSR $CC8B JSR $D6D2	JSR $BD84 JSR $C92D	-	Y register	Accumulator
(b) 1 double byte	SYS (Location) Exp.	JSR $AD9E JSR $B7F7	JSR $CD9E JSR $D7F7	JSR $CC9F JSR $D6D2	JSR $BD98 JSR $C92D			
2 double bytes	SYS (Location) Exp (Exp)	JSR $AD9E JSR $B7F7 STA $FC STY $FB JSR $AD9E JSR $B7F7	JSR $CD9E JSR $D7F7 STA $FC STY $FB JSR $CD9E JSR $D7F7	JSR $CC9F JSR $D6D2 STA $02 STY $01 JSR $CC9F JSR $D6D2	JSR $BD98 JSR $C92D STA $02 STY $01 JSR $BD98 JSR $C92D		(1st double byte...... $FB C-64/VIC $01 B2/B4 (2nd double byte .... Y register	) $FC C-64/VIC $02 B3/B4) Accumulator

Notes 1. Where alternatives are ((a), (b) etc.) then either may be chosen.

2. Care has to beexercised with the exact SYNTAX — the routines will crash with a SYNTAX ERROR if commas are inserted when they are not expected by the interpreter.

3. In the last case (2 double bytes) then locations $FB,$FC are usable in <u>any</u> CBM machine. However, BASIC 2/4 uses these zero page locations as part of the machine language monitor and if you are attempting to view the results of experiments with the above routines then your wishes will be thwarted if you use the monitor! Accordingly, I have relocated the locations to $01/$02.

Application 1 : Computed 'GOTO'

This is fairly simple to achieve. All that we have to do is to pass the data for one double byte value and then access the 'GOTO' routine at a later point. The first called subroutine computes the number but leaves it in floating point accumulator#1 in a format which is not easily readable — the second called sub-routine takes the contents of this accumulator and leaves it in $14/15 (64 and VIC) or $11/12 (BASIC 2/4)

64	VIC	BASIC 2	BASIC 4	FUNCTION
JSR $AD8A	JSR $CD8A	JSR $CC8B	JSR $BD84	Evaluate expression
JSR $B7F7	JSR $D7F7	JSR $D6D2	JSR $C92D	Convert FPAC#1
JMP $A8A3	JMP $C8A3	JMP $C7B0	JMP $B833	Jump to later part of 'GOTO'

Syntax SYS (Location) expression eg SYS (828) 5*100+10

Decimal loaders (for those without an assembler)

These routines are completely relocatable but, following convention, I will put them at the start of the (second) or only cassette buffer. This would take the form (assuming it had a line number in program mode):

FOR J=828 TO 836 : READ X: POKE J,X: NEXT (followed by a data line)

```
DATA 32,138,173,32,247,183,76,163,168  (C-64)
DATA 32,138,205,32,247,215,76,163,200  (VIC)
DATA 32,139,204,32,210,214,76,176,199  (BASIC 2)
DATA 32,132,189,32,  45,201,76,  51,184  (BASIC 4)
```

If you would like a routine that performs a computed GOTO and is really compact but a little more clumsy in its use, then you could always utilise the routine which expects a double and a single byte and which happens to leave the result in the 'correct' locations.

This routine is actually part of the POKE expression 1, expression 2 routine (the double byte parameter being the location and the single byte parameter the value that is normally 'poked' in)

Here again are versions for each machine:

64	VIC	BASIC 2	BASIC 4	FUNCTION
JSR $B7EB	JSR $D7EB	JSR $D6C6	JSR $C921	Take in values & evaluate
JMP $A8A3	JMP $C8A3	JMP $C7B0	JMP $B833	Jump to later part of 'GOTO'

Syntax SYS (Location) expression, 0 (Note — this routine expects, nay demands a second value so keep it happy with a 0 or anything 0-255)

Decimal loader (as before!)

FOR J=828 TO 833 : READ X : POKE J,X: NEXT

```
DATA 32,235,183,76,163,163  (64)
DATA 32,235,215,76,163,200  (VIC)
DATA 32,198,214,76,176,199  (BASIC 2)
DATA 32,  33,201,76,  51,184  (BASIC 4)
```

Application 2 : PRINT AT
(C-64 only)

This second application involves positioning the cursor on the screen according to the values for the column and the row supplied. It is written only for the 64 as the screen processing routines vary from one version of the CBM machine to another and the ROMS are not strictly comparable. In any case, BASIC 2/4 owners can use the following:

```
POKE 198, horizontal: POKE 216, vertical:
SYS 57949 (BASIC 2)/ SYS 57471 (BASIC 4
  9"")/SYS 57457 (BASIC 4 12"")
SYS 57439 (BASIC 4 80 col)
```

Here is the routine for the 64: remember that we need the routine to supply two single byte parameters,one being for the row and the other for the column. There is *no* error checking to ensure the values are in the correct range to keep the routine compact.

64	FUNCTION
JSR $B7EB	Get the two values and evaluate them
LDY $14	Load the Y register with $14 (deposited by 1st line)
CLC	Clear the carry flat before entering PLOT
JSR $FFF0	Call Kernal PLOT routine to position cursor
JMP $AA9D	Join PRINT routine (but ensure a ; after the second parameter)

Syntax

SYS (Location) column, row; "string to be printed or string variable";

Trail program

```
10 PR=828 : A$="(REVERSE) ":PRINT
   CHR$(147): REM CLEAR SCREEN
20 FOR J=0 TO 24: FORK=0 TO 39:
   SYS(PR) K,J;A$;:NEXT K,J:END
```

Decimal Loader (assuming program mode)

```
FOR J=828 TO 839 : READ X: POKE J,X:
   NEXT
DATA 32,235,183,164,20,24,32,240,255,
   76,157,170
```

Note A ; delimiter after the string to be printed allows you to print consecutive values along the bottom line — otherwise a carriage return will be executed after each value printed.

With a little experimentation, I am sure you will be surprised how versatile the machine has become!

Correction

The PET Project page 48 of the March issue included a block of listing 15 lines long (16 lines including the two with only a full stop) at the end. What was printed is the correct format for 40 column machines. For 80 column machines, substitute the following lines for the respective lines in the 40 column listing:

```
.: 7028 06 80 8D 07 80 A9 06 8D
.: 7030 10 E8 AD 12 E8 C9 BF FO
```

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Help is at hand

More readers share their experience with useful routines for the 64, VIC and PET

MACHINE CODE TO DATA FOR THE VIC + 16K

This routine was sent to us by R Nickson of St Helens, Merseyside.

This utility programme automatically converts machine code into basic lines of Data statements for a basic machine code loader.

Written for a VIC with 16K extra RAM, it sits snuggly at the end of Basic at 5E00 HEX (24064 Dec). After entering and saving the listing into the VIC, run the program, type SYS24064 and you will be presented with the first of three prompts. The first asks you for the Start Address of your machine code; the second for the End address and the third for the number at which you would like your data statements to start at.

The Start and End address inputs must always be entered as a four figure HEX number regardless of where your machine code lies. The third input for the start of your Basic line number must be entered in decimal. After entering the required information, you will be asked to Press "Y" or "N." "Y" will start the conversion at a very fast pace; "N" will re-start the programme for fresh inputs.

The program can easily be converted for any VIC configuration or for any Commodore machine. Anyone with a machine code assembler and a little knowledge of 6502 should have no problems. Apart from a few absolute addresses to be corrected, there are a few pointers for the "Print a string" routine (CB1E", ie the Y & A registers must be altered; five numbers which are the start of a subroutine are poked into the keyboard buffer to create an SYS call and must also be corrected.

The program also uses a few of the VIC ROM routines which must be altered by users of machines other than the VIC.

I have used this program successfully for the past twelve months, saving myself considerable time when programming.

```
0 REM  M/C TO DATA.   BY R. NICKSON
10 POKE52,94:POKE56,94
20 C=0:FORI=0TO479:READD:POKE24064+I,D:C=C+D:NEXT
30 IFC<>50865THENPRINT"DATA ERROR!!!":END
40 PRINT"┘ TO ACCESS M/C TO DATA ▓ ENTER:- SYS 24064":END
100 DATA160,95,169,124,32,30,203,32,19,95,32,42,95,32,107,95,160,95
101 DATA169,167,32,30,203,32,19,95,32,42,95,162,2,32,109,95,160,95
102 DATA169,185,32,30,203,32,19,95,202,169,0,157,60,3,165,122,164,123
103 DATA141,96,3,140,97,3,169,60,160,3,133,122,132,123,32,121,0,32
104 DATA107,201,173,96,3,172,97,3,133,122,132,123,162,0,165,20,157,80
105 DATA3,165,21,157,81,3,160,95,169,203,32,30,203,32,228,255,240,251
106 DATA201,89,240,7,201,78,208,243,76,0,94,169,147,32,210,255,174,80
107 DATA3,173,81,3,32,77,95,169,32,32,122,242,169,68,32,122,242,169
108 DATA97,32,122,242,169,0,133,250,162,0,161,251,170,169,0,32,77,95
109 DATA165,251,197,253,208,9,165,252,197,254,208,3,76,0,95,165,251,201
110 DATA255,208,2,230,252,230,251,230,250,165,250,201,18,240,8,169,44,32
111 DATA122,242,76,152,94,173,80,3,201,255,208,9,173,81,3,24,105,1
112 DATA141,81,3,173,80,3,24,105,1,141,80,3,162,0,189,245,94,157
113 DATA119,2,232,224,11,208,245,138,133,198,96,145,145,13,83,217,50,52
114 DATA49,56,51,13,104,104,162,0,189,245,94,157,119,2,232,224,3,208
115 DATA245,138,133,198,96,162,0,134,255,32,228,255,240,251,32,210,255,166
116 DATA255,157,60,3,232,201,13,208,236,96,162,0,189,60,3,201,65,144
117 DATA3,56,233,7,56,233,48,224,1,240,8,224,3,240,4,10,10,10
118 DATA10,149,87,232,224,4,208,224,96,134,99,133,98,162,144,56,32,73
119 DATA220,32,223,221,133,174,132,175,160,0,177,174,240,6,32,122,242,200
120 DATA208,246,96,162,0,165,87,24,101,88,149,252,165,89,24,101,90,149
121 DATA251,96,147,32,32,32,32,32,77,47,67,32,84,79,32,68,65,84
122 DATA65,17,17,17,32,32,32,32,32,32,83,84,65,82,84,32,65,68
123 DATA68,82,69,83,83,58,45,0,0,17,69,78,68,32,32,65,68,68
124 DATA82,69,83,83,32,58,45,0,0,17,76,73,78,69,32,78,79,32
125 DATA83,84,65,82,84,58,45,0,0,17,17,17,17,32,32,32,32,32
126 DATA32,79,75,63,32,40,89,47,78,41,0,0
```

SOLVING TOKEN PROBLEMS

This routine was sent to us by Sunil Tanna of Bedford

I noticed that John Consadine sent in a tip to the New Year issue of CCI, about tokens. His program was fairly limited in that it only worked for that program. Here's the program to solve all token problems. This program will change any token to any other token on any BASIC program line. As an example type in the program, RUN it, and enter the following numbers:

500 (RETURN)
143 (RETURN)
153 (RETURN)

After a moment the program should say "CHANGED" and then return the ready prompt. LIST the program, and you will see that line 500 has changed from a REM line into a PRINT line.

```
10 rem commodore 64 version
20 rem change line 130 to ma=1027 for all pets
30 rem change line 130 to ma=4099 for unexpanded vic
40 rem change line 130 to ma=1027 for vic with 3k extra
50 rem change line 130 to ma=4611 for vic +8k or more
60 :
100 input"Which basic line ";bl
110 input"Which token      ";tf
120 input"Change to        ";tt
130 ma=2051
140 h=int(bl/256)
150 l=bl-h*256
160 :
170 rem loop
180 cl=peek(ma)+peek(ma+1)*256
190 if cl>bl then print"not found.":end
200 if cl=bl then 270
210 ma=ma+2
220 if peek(ma)<>0 then ma=ma+1:goto220
230 ma=ma+3
240 goto 180
250 :
260 rem alter line
270 ma=ma+2
280 if peek(ma)=0 then print"not found.":end
290 if peek(ma)=tf then poke ma,tt:print"changed.":end
300 ma=ma+1
310 goto 280
500 rem "watch this line."
```

Here's a complete list of tokens in BASIC 2:—

128 END
129 FOR
130 NEXT
131 DATA
132 INPUT#
133 INPUT
134 DIM
135 READ
136 LET
137 GOTO
138 RUN
139 IF
140 RESTORE
141 GOSUB
142 RETURN
143 REM
144 STOP
145 ON
146 WAIT
147 LOAD
148 SAVE
149 VERIFY
150 DEF
151 POKE
152 PRINT#
153 PRINT
154 CONT
155 LIST
156 CLR
157 CMD
158 SYS
159 OPEN
160 CLOSE
161 GET
162 NEW
163 TAB
164 TO
165 FN
166 SPC(
167 THEN
168 NOT
169 STEP
170 +
171 −
172 *
173 /
174 ↑
175 AND
176 OR
177 <
178 –
179 >
180 SGN
181 INT
182 ABS
183 USR
184 FRE
185 POS
186 SQR
187 RND
188 LOG
189 EXP
190 COS
191 SIN
192 TAN
193 ATN
194 PEEK
195 LEN
196 STR$
197 VAL
198 ASC
199 CHR$
200 LEFT$
201 RIGHT$
202 MID$
255 π

I'll leave you to investigate further into tokens and their uses.

TEXT EDITOR

This tip was sent to us by John Consadine of N Ferriby, N Humberside.

Text Editing refers to the use of computers to simplify making corrections to a text, where the text may be a computer program, a report, or a poem. In business the use of computers in this way is called word processing.

A real text editing or word-processing application would have the original text saved in a file, but for this example the text we want to edit is contained in a single DATA statement for simplicity.

The program first prints the original text and then requests the user to enter the bad string, which is to be replaced, and the replacement string. The replacement is made and the modified text is printed. Notice that the bad string and the modified string do not have to have the same length.

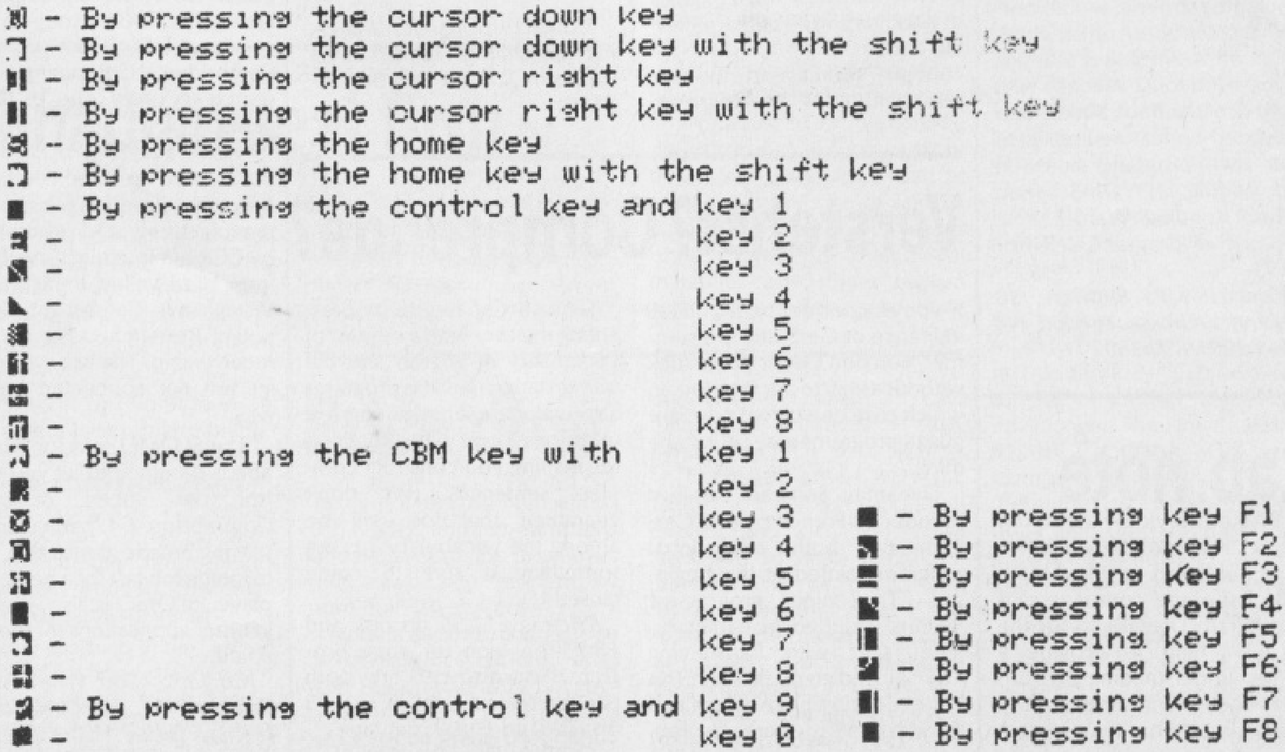
Text Editor is intended to be used as an experimental subroutine for string manipulation and could be modified, for example, to search for more than one occurrence of the bad string in the same text.

Although this routine was written on a Commodore PET it should run on any micro that can manipulate strings.

```
ORIGINAL TEXT: THE QUICK BROWN HORSE JUMPED
OVER THE LAZY DOG
ENTER BAD & REPLACEMENT STRINGS
HORSE
FOX
MODIFIED TEXT: THE QUICK BROWN FOX JUMPED OVER
THE LAZY DOG
```

```
10 REM *******************
15 REM TEXT EDITOR
20 REM J.CONSADINE 24/1/85
30 REM *******************
35 REM READ & PRINT ORIGINAL TEXT
40 READOT$
45 PRINT"ORIGINAL TEXT:    ";OT$
50 PRINT"ENTER BAD & REPLACEMENT STRINGS"
60 INPUTBS$,RS$
70 L1=LEN(OT$):L2=LEN(BS$)
85 REM
90 REM FIND BAD STRING IN ORIG.TEXT
95 REM
100 GOSUB1000
110 IFJ=0THEN160
115 REM
120 REM BAD STRING FOUND.REPLACE IT WITH NEW STRING
125 REM
130 N$=LEFT$(OT$,J-1)+RS$+MID$(OT$,J+L2,L1+1-J-L2)
140 PRINT"MODIFIED TEXT:    ";N$
150 STOP
160 PRINTBS$;" NOT FOUND"
170 GOTO60
180 DATA"THE QUICK BROWN HORSE JUMPED OVER THE LAZY DOG"
1000 FORJ=1TOL1-L2+1
1010 IFBS$=MID$(OT$,J,L2)THEN1040
1020 NEXTJ
1030 J=0
1040 RETURN
```

CURSOR CHARACTERS



```
■ - By pressing the cursor down key
■ - By pressing the cursor down key with the shift key
■ - By pressing the cursor right key
■ - By pressing the cursor right key with the shift key
■ - By pressing the home key
■ - By pressing the home key with the shift key
■ - By pressing the control key and key 1
■ -                                 key 2
■ -                                 key 3
◣ -                                 key 4
■ -                                 key 5
■ -                                 key 6
■ -                                 key 7
■ -                                 key 8
■ - By pressing the CBM key with    key 1
■ -                                 key 2
■ -                                 key 3    ■ - By pressing key F1
■ -                                 key 4    ■ - By pressing key F2
■ -                                 key 5    ■ - By pressing Key F3
■ -                                 key 6    ■ - By pressing key F4
■ -                                 key 7    ■ - By pressing key F5
■ -                                 key 8    ■ - By pressing key F6
■ - By pressing the control key and key 9    ■ - By pressing key F7
■ -                                 key 0    ■ - By pressing key F8
```

Warp drive for disk

Smooth and fast seem to be key words for MPS Software, which recently released Toolkit MK.11 and Warp-5/Boot Maker for the 64.

Toolkit MK.11 upgrades the original Toolkit with a range of facilities that include a sector editor, file recovery, a single drive file copier and disk copier. At £17.95 for new buyers or £4.50 for owners of the original Toolkit version, Toolkit MK.11 also offers an error maker which will instantly reproduce any error anywhere on a disk with safety backups that can be made of virtually every disk. An additional error locater finds any and all errors on the disk.

The combination of Warp-5 and Boot Maker will take your disk drive to loading speeds suitable to the lightning pace of most of today's sophisticated arcade games. MPS says loading speeds will be increased by an average of five times over current loading time, a feature that will help not only with loading one disk but with switching from one to another in multi-disk games.

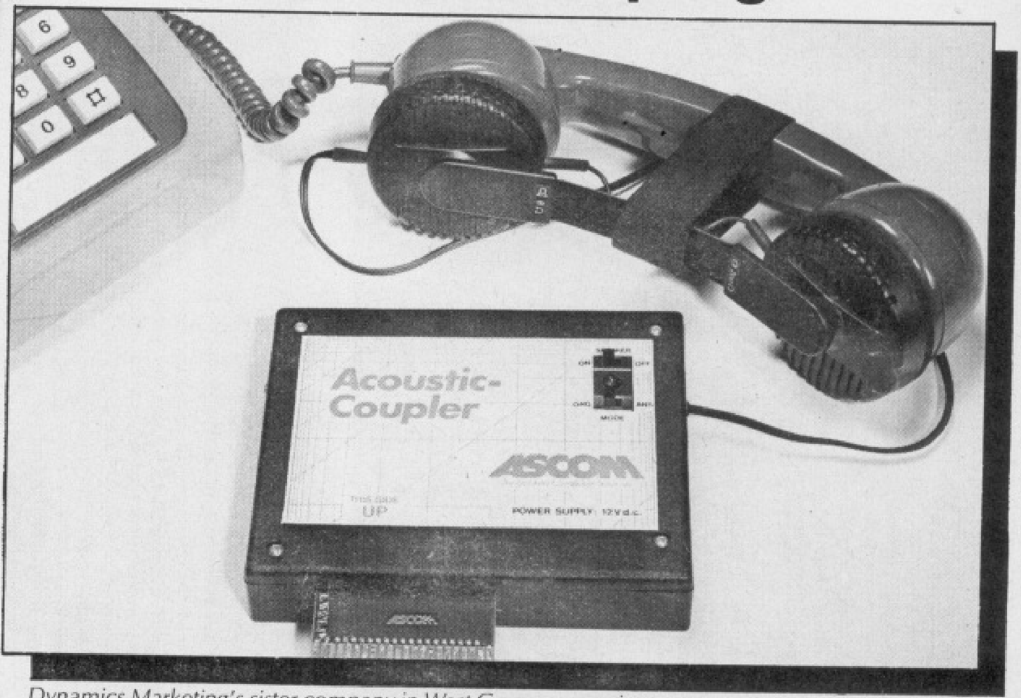
One example given is a 154 Block program that would normally load in about one minute, 40 seconds. MPS says that will be speeded to 22 seconds with Warp-5. Add Boot Maker and the speed-up feature applies to your own programs auto-run and loading at Warp-5 speed without loading Warp-5 first. The pair of programs sells for £9.95.

Contact: MPS Software, 36 Alexandra Grove, London N4 2LF. Tel: 01-800 3592

Lab note

Associated Services have asked us to clarify a point in our news story published in the March 1985 issue. the company says its program Digital Lab for the 64 will "help to provide a clearer understanding of Boolean Algebra with reference to Logic Circuits," but the program assumes the user has a basic understanding of Boolean.

Dynamic coupling



Dynamics Marketing's sister company in West Germany was in on the project to design the latest acoustic coupler.

An acoustic coupler, ASCOM, is one of the latest additions to the wide range of communications products on the market.

Introduced by Dynamics Marketing, the modem-type device translates computer signals into audio signals that, when attached to one telephone, transmits those signals to another phone at the receiving end.

At the source end, the two plastic-moulded covers are attached to the mouthpiece and earpiece of the receiver. The box portion attaches to the 64 to accept and relay the computer's signals.

Dynamics Marketing is a new subsidiary of Coin Controls, the manufactures of the Kempston range of joysticks.

Contact: Dynamics Marketing Ltd, Unit 2, Franklin Street, Oldham OL1 2AX. Tel: 061-665 2760.

Verstehst? Comprende?

If you're considering a holiday in France or Germany this summer, you don't want to be stuck without a way to ask for a loo, in which case one of two new language programs may be just the thing!

Dynamite Software has just introduced French 64 and German 64, both educational programs aimed at the beginner. The nine progressive lessons included in each program start with Introducing Yourself and go on through The House, Shopping, Animals and Asking the Way (there you are), among other crucial topics that crop up in daily conversation.

Each section begins by presenting the user with a new list of vocabulary in English and the foreign language. The programs also include examples and test questions along with a function for helping you construct complete sentences. (We don't guarantee that loo will be among the vocabulary list, but something is sure to come close.)

Price is £12.95 on disk and £8.95 on tape for each program. You also can buy both packages for a total of £16.95 on disk and £12.95 on tape.

Contact: Dynamite Software, BCM 8713, London WC1N 3XX.

SLOMO not dead

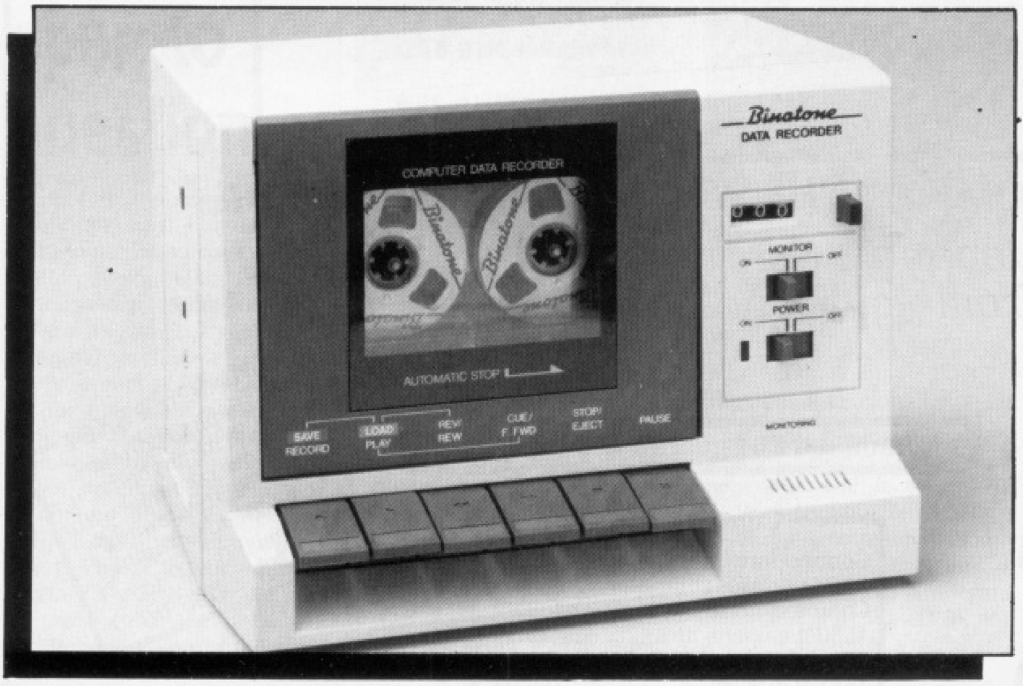
For any CCI readers interested in SLOMO games speed controller we wrote about in the December 1984 issue, do not — repeat DO NOT — write to Cambridge Computing Research to order one of these gems.

Nidd Valley Micro Products has cleared up some confusion over the product which was manufactured and distributed by CCR but is actually available from Nidd Valley. In fact, Nidd Valley says Cambridge Computing Research Ltd is now in receivership. The two companies are not connected in any way.

The SLOMO sells for £14.95 and is designed to let you control the speed of your Commodore 64, particularly in playing arcade games that may be going too fast for a beginning player. SLOMO is also valuable in other applications for the disabled.

Contact: Nidd Valley Micro Products Ltd, Stepping Stones House, Thistle Hill, Knaresborough, N Yorks HG5 8JW. Tel: 0423 864488

New style recorder



Binatone hopes to use its new data recorder to replace the traditional "shoebox-shaped recorders."

Binatone International has developed a possibility for upgrading your data cassette mechanism with its new Data Recorder.

Model 1 01/6560 is plug-compatible with the Commodore VIC 20 and 64 and gives the user optimised circuitry for Load and Save functions, a tape counter, cue/review and front-loading.

The Binatone Data Recorder, which also has a pause button, sells for £34.95.

Contact: Binatone International Ltd, Binatone House, 1 Beresford Avenue, Wembley, Middlesex HA0 1YX. Tel: 01-903 5211/6322

Cheetah speaks up

The manufactures of the RAT infra-red joystick, Cheetah Marketing, have announced plans for several new products to be released early this Spring.

Among the potential offerings are a plug-in Speech Synthesis Module for the 64. The Module operates on the allophone method and Cheetah says the price will be well under £30. A two-way aerial adaptor for computer/TV input at a cost of £2 is also coming up, and a range of new games for the 64 are planned, but no details have been released as yet.

Contact: Cheetah Marketing Ltd, 24 Ray Street, London EC1R 3DJ. Tel: 01-833 4909

Programming start to end

Century Communications has combined two of its popular books into an Omnibus edition that takes the 64 owner from the very first steps in programming through advanced uses such as graphics, sprites and sound.

Set in a fairly large type, the new book, called Commodore 64 Omnibus: A Comprehensive Programming Course, comprises 500 pages for a cost of £9.95 in paperback of £14.95 hardback. From the beginnings of Basic to the machinations of machine code, Peter Lupton and Frazer Robinson have cleared up some confusing materials in their two previous books and made a few corrections along the way.

The two books from which Omnibus is taken are The Commodore 64 Handbook and The Advanced Commodore 64 Handbook. The two authors also have put together Super Basic For The Commodore 64, a package of machine code routines to add 36 new utility, sound, colour, graphics and sprite commands to the 64. The Super Basic program is £9.95, including the cassette and booklet.

A program called Bikesafe teaches motocycle safety training in a combination of quiz and arcade game. Available now on the 64 for £11.95, a previous version won The Times national Micro Computer Challenge Competition in 1984.

Another newly-released book title is the Century Computer Programming Course For The Commodore 64, which sells for £9.95 paperback or £14.95 hardback.

Contact: Century Communications Ltd, (Century Publishing for books), Sales Department, Portalnd House, 12-13 Greek Street, London W1V 5LE.

Canadian deal firm

The popular PaperClip word processing package and a data management program, The Consultant, are among the range of software that will soon be available in the UK from Ariolasoft.

Ariolasoft has confirmed an agreement for exclusive manufacture and sales of products from the Canadian-based software company, Batteries Included. BI is a privately owned company, among North America's top five consumer software manufacturers.

Other products in the line are Homepak, a domestic management package, and Home Organiser, a series of dedicated programs designed "to solve household and hobby headaches." Prices for any of the titles have yet to be fixed.

Contact: Ariolasoft UK, Ashphelte House, Palace Street, London SW1. Tel: 01-834 8507.

Price drop

The computer communciations rush has led another company, Tandata, to slash the price of its multi baud rate modem by more than 20 percent.

Tandata announced the price cut recently for the Tm200, originally retailing for £217 but now available for £173. "The price cut has been made possible by the increased volume of production and sales throughout our product range..." says managing director Roy Pend.

The Tm200 allows 75/1200, 1200/75, 1200/1200 half duplex and 300/300 baud rates. Up to eight telephone numbers can be dialed and recalled automatically. The modem's permanent memory also stores a description and ID for each number.

Contact: Tandata Marketing Ltd, Albert road north, Malvern, Worcestershire WR14 2TL. Tel: 06845 68421.

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Ledger open to question

INCA 4 is a purchase ledger with a new twist — a category that allows you to specify how late to pay your bills!

Accounting Software, the creator of what it calls the "immoral purchase ledger," says the "payment policy" category lets the user insert one of nine codes to indicate how promptly or how late the invoice is to be paid. The choice ranges from on time to 365 days late.

The ledger, new for the 8000 series PETs, also calculates whether it would be profitable to take settlement discounts and provides a proposed payment list.

INCA 4 raises some questions of business ethics, but meanwhile it may be a feasible way of spreading payments to suppliers in ways most convenient and profitable to the customer. Indeed, AS seems quite proud that INCA 4 "helps you manipulate your creditors and cash-flow to the maximum advantage."

AS stresses that "INCA 4 is also highly competent as a moral purchase ledger, being designed by two Chartered Accountants primarily for Accounting Practices." Among the inclusions are stop notices, control accounts and journal facilities.

INCA 4 sells for £395. Other programs in Accounting Software's range for the PET include Time Recording, Sales/Fees Ledger, Nominal Ledger, Portfolio Management.

Contact: Accounting Software, 16 Merchants road, Clifton, Bristol BS8 4EP. Tel: 0272-730950

STOP PRESS

Firms operating AWP and club gambling machines can get a new management package called Slotmaster to do machine calculations, meter readings, cash reconciliation and location reports, complete with an 8296D, printer, software, ancillaries and 12 months maintenance for £4,950 plus VAT.

Contact: Anagram Systems, 60A Queen Street, Horsham, West Sussex RH13 5AD. Tel: 0403-59551.

64 in general

GENLAB
GENLAB
CIL

From Space lab to GENLAB... Well, not quite, but CIL Microsystems has completed its design of a general monitoring and control unit for laboratory use, hence the name GENLAB.

A four-inch screen to display menu and instructions dominates the front panel, which also includes two voltage monitoring sockets (AC and DC measurement) and a socket for a Strain Gauge bridge if necessary, along with other basic functions. The user can do a X-Y plotting and recording, waveform generation checking and inductance, capacitance and resistance measuring.

GENLAB costs £660 and comes with a one-year guarantee. Options such as a 128K RAM card or 8K battery pack memory module also are available.

CIL also claims the lowest priced 4.5 digit panel meter on the market with its new MPM 70. Priced at £60, the meter has up to 64 selectable functions and RS232 computer link. If connected to the isothermal unit, the MPM 72 (£25), the combination forms a multifunction temperature indicator.

Contact: CIL Microsystems Ltd, Decoy Road, Worthing, Sussex BN14 8ND. Tel: 0903-204646

New ADC Interface

Digital Design and Development is continuing its scientific and industrial work with a new analog/digital computer interface.

Called OPTO ADC, the interface is designed to run with various micros, including Commodores and retails for £700. Applications include process control and manufacturing industry using floating earth systems.

The OPTO ADC has an eight-channel differential multiplexer, BIFET variable gain amplifier with 100 percent off-set control, 13-bit dual slope integrating analog to digital convertor and floating power supply. It is suitable for interfacing a Commodore with instruments and probes that require a very high input impedance as well as floating earth.

Contact— 3D Ltd, 18/19 Warren Street, London W1P 5DB. Tel: 01-387 7388.

Office of the future

The role of management could be radically revised with secretaries actually becoming genuine partners to managers, according to a new book from Colins Publishers.

Ross Burgess and Joseph St John Bate predict some dramatic changes in the way the average office works, and some of those changes already are apparent in The Automated Office.

"Since secretarial staff have many of the skills required for the automated office (which is more than can be said for many managers) they could start to take on some of the manager's work and become a genuine partner to the manager — or even part of the management," says Burgess and St John Bate.

Other positions covered in The Automated Office, which retails at £7.95, are clerical worker, professional worker and executive. It also touches on the potential changes in office equipment, how it is used and how it affects productivity.

Contact: Collins Professional and Technical Books, 8 Grafton Street, London W1X 3LA. Tel: 01-493 7070.

New firm enters data industry

Mowlem technology group has formed a new branch for the data-acquisition and control industry. Called Mowlem Microsystems Ltd, the new company is coming into the market with systems based on the ADU (Autonomous Data acquisition Unit).

The ADU, basically an interface between transducers and microcomputers, is compatible with "all readily available microcomputers, and accepts signals from a wide range of transducers..." It also works as a process controller with analog and digital outputs.

The ready-to-use unit contains all necessary hardware and software routines for data acquisition, test sequencing and adaptive control. Mowlem says the ADU requires "minimal specialist skills" and offers full flexibility for the system since the computer is free for other things while tests are being run on the ADU.

Managing Director Martin McNair says one of the many applications is monitoring hydraulic components in aircraft. In fact, prices vary depending on the "cards" required for specific applications and a basic system would likely be in the £2,500-3,000 price range.

Contact: Mowlem Microsystems, Eastman Way, Hemel Hempstead, Herts HP2 7HB. Tel: 0442-218355.

Payroll Master

The Master Payroll Package for the Commodore 8000 series

This outstanding payroll program is designed to Inland Revenue specifications for computerised payroll. All you require is a CBM 8032, CBM 8050 disk drive and a compatible printer (the 8296 version available soon).

The package features: all tax codes — all NI codes — automatic Statutory Sick Pay calculation — automatic holiday pay calculation (version 3 only) — 3 overtime rates of pay — 4 pre-tax adjustments (pre-set if required) — 4 after-tax adjustments (pre-set if required) — cost analysis up to 26 groups/departments — individual (payslip) and total (payday) cash analysis — system controlled numbering (Payroll No.) of employees — end of year print-out of P60's & P35's — up to 500 employees on a single disk (CBM 8050) — payslips and P60's printed on "off the shelf" continuous stationery — P35's, employees records, employees names and addresses printed on plain paper — ability to reprint the most recent payrun after the system has been closed down and the computer switched off and much more including access to "help" screens at all times — **plus exclusive 5 minute updating facility.**

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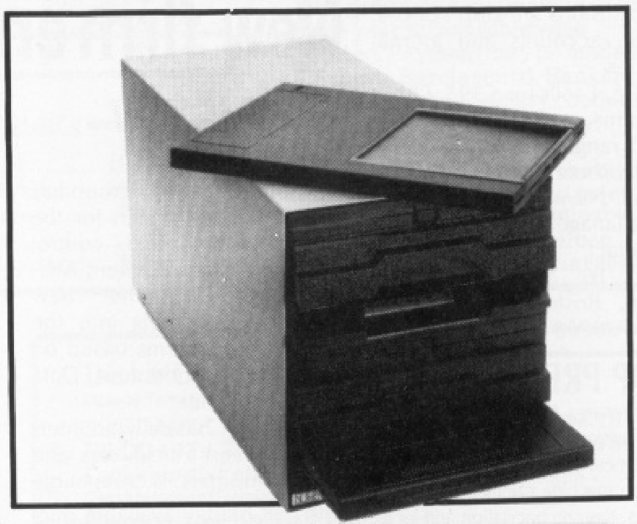

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Know your IRQ

David Hornsby explains the PET's IRQ (Interrupt ReQuest) and describes how to add extra features as creating a permanent window and playing music under interrupt control

What is IRQ?

Interrupts were described in general terms last month, with particular reference to NMI. IRQ is similar but is 'maskable', in other words it may be turned on and off by the programmer. Two machine code instructions do this:

SEI (set the interrupt disable flag) — disable IRQ

CLI (clear the interrupt disable flag) — enable IRQ

PET's normally have IRQ on, performing several vital functions. A hardware clock circuit activates IRQ 60 times a second (50 times for large screen PET's). One machine code instruction — BRK (break) — has the same effect but additionally sets the BREAK flag.

The PET IRQ

A 6502 microprocessor receiving an IRQ or encountering the BRK instruction will complete the instruction it is performing and, provided the interrupt flag is clear, save the program counter register and the status register on the stack. The address at memory locations $FFFE and $FFFF is then jumped to. The routines in the PET's ROM then do six things:

1) Save the A, X, and Y registers on the stack. (This is standard procedure for any 6502 computer.)
2) Check to see if the interrupt was caused by the BRK instruction or by IRQ (by examining the status register on the stack: this contains the BREAK COMMAND flag). For flexibility, the program proceeds via the address contained in RAM memory locations $0090 and $0091 ($0219 and $021A for BASIC 1 PETs) for the hardware interrupt. If a BRK instruction caused the interrupt, then a separate path via $0092 and $0093 ($021B and $021C for BASIC 1 PETs) is taken and the machine code monitor is entered (not BASIC 1). Otherwise, four more functions are performed:
3) The jiffy clock is updated by 1/60 (or 1/50)th of a second.
4) The stop key is checked.
5) The cursor flash routine is run.
6) The keyboard is scanned and read. The interrupt ends with the registers being restored (step 1 above in reverse) and exits with the RTI instruction.

How to Add Functions to IRQ

This is easily done by changing the address in RAM at $0090 and $0091 to point to some extra code. In the first program example, this is done at line 300. This code should end with a jump back to the interrupt routine (line 670), otherwise the clock, stop key, cursor and keyboard routines will not run.

Additional uses for IRQ may be divided into two types. Firstly, those that modify the existing interrupt functions (eg add a repeat key, disable the stop key or the clock, alter the cursor flashing, re-define the keyboard). Secondly, those that add new functions — testing for an interrupt from the user port and servicing it, altering the VDU display (example one), testing for several simultaneous key closures (My EPSON DUMP routine, May 1983), playing music during the running of the main program (example two), adding function keys (to be described in a future article), and so on.

Example One

A permanent message is fixed onto the top four lines of the screen. The message is first printed on the screen, then SYS32543 copies it to a spare section of RAM. SYS32512 activates the IRQ routine which copies the message back to the VDU at each interrupt, ie 60 (or 50) times a second.

This has the effect of creating a permanent "window." The routine works with 80 column machines but they have a window facility already. The assembly listing gives the changes for those not having BASIC 4. A 32K memory is assumed. The second listing is an example of its use and contains the machine code (BASIC 4) in data statements.

```
100  033A            ;*********************************
110  033A            ;* ROUTINE TO DISPLAY A MESSAGE *
120  033A            ;* ON THE TOP OF THE SCREEN ALL *
130  033A            ;* THE TIME -THROUGH USE OF IRQ *
140  033A            ;*********************************
150  033A            ;
200  033A            *=$7F00
210  00A0            NUMBER=160 ;4 LINES OF 40
220  8000            SCREEN=32768 ;START OF SCREEN RAM
230  7F60            SPARE=32768-NUMBER ;SPARE RAM FOR SCREEN
240  E455            IRQ=$E455 ($E685/$E62E FOR BASIC 1/2)
250  0090            IRQVEC=$90 ($0219 FOR BASIC 1)
290  7F00            ;
300  7F00            ;TURN IRQ ROUTINE ON -SYS32512
310  7F00            ;===================
320  7F00  A911                LDA  #<START
330  7F02  A27F                LDX  #>START
340  7F04  D004                BNE  SET               ;FORCED JUMP
390  7F06            ;
```

```
400   7F06              ;TURN IRQ ROUTINE OFF -SYS32518
410   7F06              ;=====================
420   7F06  A955                      LDA  #<IRQ
430   7F08  A2E4                      LDX  #>IRQ
490   7F0A              ;
500   7F0A  78          SET           SEI
510   7F0B  8590                      STA  IRQVEC
520   7F0D  8691                      STX  IRQVEC+1
530   7F0F  58                        CLI
540   7F10  60                        RTS
590   7F11              ;
600   7F11              ;THE MAIN ROUTINE
610   7F11              ;================
620   7F11  A2A0        START         LDX  #NUMBER
630   7F13  BD5F7F      START1        LDA  SPARE-1,X
640   7F16  9DFF7F                    STA  SCREEN-1,X
650   7F19  CA                        DEX
660   7F1A  D0F7                      BNE  START1
670   7F1C  4C55E4                    JMP  IRQ
690   7F1F              ;
700   7F1F              ;ROUTINE TO WRITE TO SPARE RAM -SYS32543
710   7F1F              ;==============================
720   7F1F  A2A0        RAMWRITE      LDX  #NUMBER
730   7F21  BDFF7F      RAMWRITE1     LDA  SCREEN-1,X
740   7F24  9D5F7F                    STA  SPARE-1,X
750   7F27  CA                        DEX
760   7F28  D0F7                      BNE  RAMWRITE1
770   7F2A  60                        RTS
```

```
100 REM PROGRAM TO WRITE A PERMANENT MESSAGE TO THE VDU
110 REM AUTHOR D.D.HORNSBY
120 :
130 POKE53,127:POKE52,0:CLR:REM LOWER TOP OF RAM POINTER TO $7F00
140 PRINT"♥RPOKING MACHINE CODE INTO RAM"
150 X=0:C%=0
160 X=X+1:READ A$:IFA$="**"THEN260
170 :
180 REM LINES 190-220 CONVERT HEX TO DECIMAL
190 A1%=ASC(LEFT$(A$,1)):A2%=ASC(RIGHT$(A$,1))
200 A1%=A1%-48+(A1%>57)*7:A2%=A2%-48+(A2%>57)*7
210 B%=A1%*16+A2% :REM B% IS DECIMAL OF DATA
220 C%=C%+B% :REM C% IS CHECKSUM
230 :
240 P=32511+X:PRINT"SQQ"P,B%:POKE P,B%:GOTO160
250 :
260 READ A%:IFC%<>A%THEN PRINT"QQRERROR IN DATA LINES":STOP:REM CHECKSUM TEST
270 :
280 REM MACHINE CODE DATA STATEMENTS
290 DATA A9,11,A2,7F,D0,04,A9,55,A2,E4
300 DATA 78,85,90,86,91,58,60,A2,A0,BD
310 DATA 5F,7F,9D,FF,7F,CA,D0,F7,4C,55
320 DATA E4,A2,A0,BD,FF,7F,9D,5F,7F,CA
330 DATA D0,F7,60
340 DATA **:REM END OF DATA MARKER
350 DATA 6534 :REM CHECKSUM TOTAL
360 :
1000 REM DEMONSTRATION PROGRAM FOLLOWS
1010 REM ------------------------------
1020 S1=32512:S2=32518:S3=32543
1030 PRINT"♥RSIMPLE DEMONSTRATION PROGRAM FOR NUMBERS"
1040 PRINT"□ ┌";:FORX=1TO38:PRINT"—";:NEXT:PRINT"┐ "
1050 PRINT"□ | NUMBER        SQUARE        SQUARE ROOT  |";
1060 PRINT" └";:FORX=1TO38:PRINT"—";:NEXT:PRINT"┘ "
1070 SYS S3: REM STORE HEADINGS IN RAM
1080 SYS S1: REM ACTIVATE IRQ
1090 FORX=1TO100
1100 PRINT TAB(3) X TAB(15) X*X TAB(27) SQR(X)
1110 NEXT X
1120 SYS S2: REM DEACTIVATE IRQ
1130 PRINT"□□"
```

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Example Two

Music is played under interrupt control. During this, a program may be run, edited, saved to disk or loaded from disk. No assembly listing is given this time. Those wishing to see how it works will have to disassemble the data statements. Remarks in the listing indicate how to use it. If there is more than one tune, the address of the second will need to be calculated and poked in byte reverse order into memory locations 1 and 2, eg line 1110: the address 32108 ($7D6C) is poked in as 108 ($6C) and 125 ($7D). Each note may be selected from the table below and should be followed by a second number, the duration in $\frac{1}{60}$ ($\frac{1}{50}$)th second. each tune ends with a 0 and the whole sequence of tunes with "**" (line 850).

Note	1st	2nd	3rd octave
C	228	114	57
C#	215	108	54
D	203	102	51
D#	192	96	48
E	181	91	45
F	171	85	43
F#	161	81	40
G	152	76	38
G#	144	72	36
A	136	68	34
A#	128	64	32
B	121	60	30
C	114	57	28
SILENCE			1 (inaudible)

```
100 REM PROGRAM TO PLAY MUSIC DURING OTHER ACTIVITIES
110 REM AUTHOR D.D.HORNSBY
120 :
130 POKE53,124:POKE52,0:CLR:REM LOWER TOP OF RAM POINTER TO $7C00
140 REM THIS LEAVES SPACE FOR OVER 450 NOTES
150 PRINT"██POKING MACHINE CODE INTO RAM"
160 X=0:C%=0
170 X=X+1:READ A$:IFA$="**"THEN270
180 :
190 REM LINES 190-220 CONVERT HEX TO DECIMAL
200 A1%=ASC(LEFT$(A$,1)):A2%=ASC(RIGHT$(A$,1))
210 A1%=A1%-48+(A1%>57)*7:A2%=A2%-48+(A2%>57)*7
220 B%=A1%*16+A2% :REM B% IS DECIMAL OF DATA
230 C%=C%+B% :REM C% IS CHECKSUM
240 :
250 P=31743+X:PRINT"███"P,B%:POKE P,B%:GOTO170
260 :
270 READ A%:IFC%<>A%THEN PRINT"███ERROR
    IN DATA LINES":STOP:REM CHECKSUM TEST
280 :
290 REM MACHINE CODE DATA STATEMENTS
300 DATA A9,12,A2,7C,D0,04,A9,55,A2,E4
310 DATA 78,85,90,86,91,58,60,01,AD,11
320 DATA 7C,C9,00,D0,3C,A0,00,B1,01,C9
330 DATA 00,D0,13,20,2A,7C,20,06,7C,4C
340 DATA 55,7C,8C,4B,E8,8C,4A,E8,8C,48
350 DATA E8,60,20,2A,7C,A2,10,8E,4B,E8
360 DATA A2,0F,8E,4A,E8,8D,48,E8,E6,01
370 DATA D0,02,E6,02,B1,01,8D,11,7C,E6
380 DATA 01,D0,02,E6,02,CE,11,7C,4C,55
390 DATA E4
400 DATA **:REM END OF DATA MARKER
410 DATA 10254:REM CHECKSUM TOTAL
420 :
430 REM POKE TUNE IN FROM 31835 ONWARDS TO 32767
440 REM EACH NOTE IS ENTERED AS A PAIR OF VALUES:
    PITCH, DURATION
450 REM DURATION IS IN 1/60 SECONDS. END SEQUENCE WITH A 0.
460 :
470 X=0
480 PRINT"██POKING MUSIC INTO RAM"
490 X=X+1: READ A$: IF A$="**" THEN 1000
500 P=31834+X:PRINT"███"P,A$:POKEP,VAL(A$):GOTO490
510 :
520 REM TUNE 1
530 REM ------
540 DATA 102,24,50,24,57,18,60,6,68,18,76,6
550 DATA 1,24,68,18,60,6,68,18,76,6,91,24
560 DATA 1,24,102,18,50,6,57,18,60,6,68,18,76,6
570 DATA 68,36,60,12,68,48
580 DATA 102,24,50,24,57,18,60,6,68,18,76,6
590 DATA 1,24,68,18,60,6,68,18,76,6,91,24
600 DATA 68,24,68,18,60,6,68,18,76,6,91,24
610 DATA 76,24,60,24,102,48
620 DATA 1,24,68,18,60,6,68,18,76,6,91,24
630 DATA 76,72,1,12,60,12
640 DATA 68,18,76,6,68,18,76,6,68,24,60,24
650 DATA 76,24,102,48,1,12,60,12
660 DATA 57,18,60,6,57,18,60,6,57,16,45,16,50,16
670 DATA 60,72,1,6,50,6
680 DATA 50,24,60,18,54,6,50,24,45,18,40,6
690 DATA 45,24,50,48,50,24
700 DATA 38,24,38,24,40,24,45,24
710 DATA 50,96
720 DATA 102,24,50,24,57,18,60,6,68,18,76,6
730 DATA 1,24,68,18,60,6,68,18,76,6,91,24
740 DATA 1,24,102,18,50,6,57,18,60,6,68,18,76,6
750 DATA 60,36,57,12,102,48
760 DATA 102,24,50,24,57,18,60,6,68,18,76,6
770 DATA 1,24,68,18,60,6,68,18,76,6,91,24
780 DATA 1,24,68,18,60,6,68,18,76,6,91,24
790 DATA 76,24,60,24,102,48
800 DATA 1,24,68,18,60,6,68,18,76,6,91,24
810 DATA 76,96,0
820 REM TUNE 2
830 REM ------
840 DATA 114,60,91,15,76,30,57,90,0
850 DATA**
1000 REM DEMONSTRATION OF USE
1010 REM --------------------
1020 POKE31761,1: REM ANY NON ZERO VALUE TO START
1030 POKE1,91:POKE2,124:REM $7C5B,
     THE START OF THE TUNE 1
1040 SYS31744
1050 FORX=1TO325:PRINTX,X*X,SQR(X),X+1
     :NEXT:REM RUN SOME BASIC
1060 :
1100 POKE31761,1: REM ANY NON ZERO VALUE TO START
1110 POKE1,108:POKE2,125:REM $7D6C,
     THE START OF THE TUNE 2
1120 SYS31744
1130 LIST:REM LIST WITH MUSIC
```

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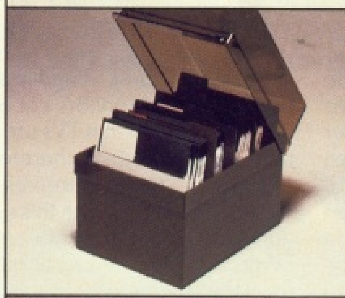

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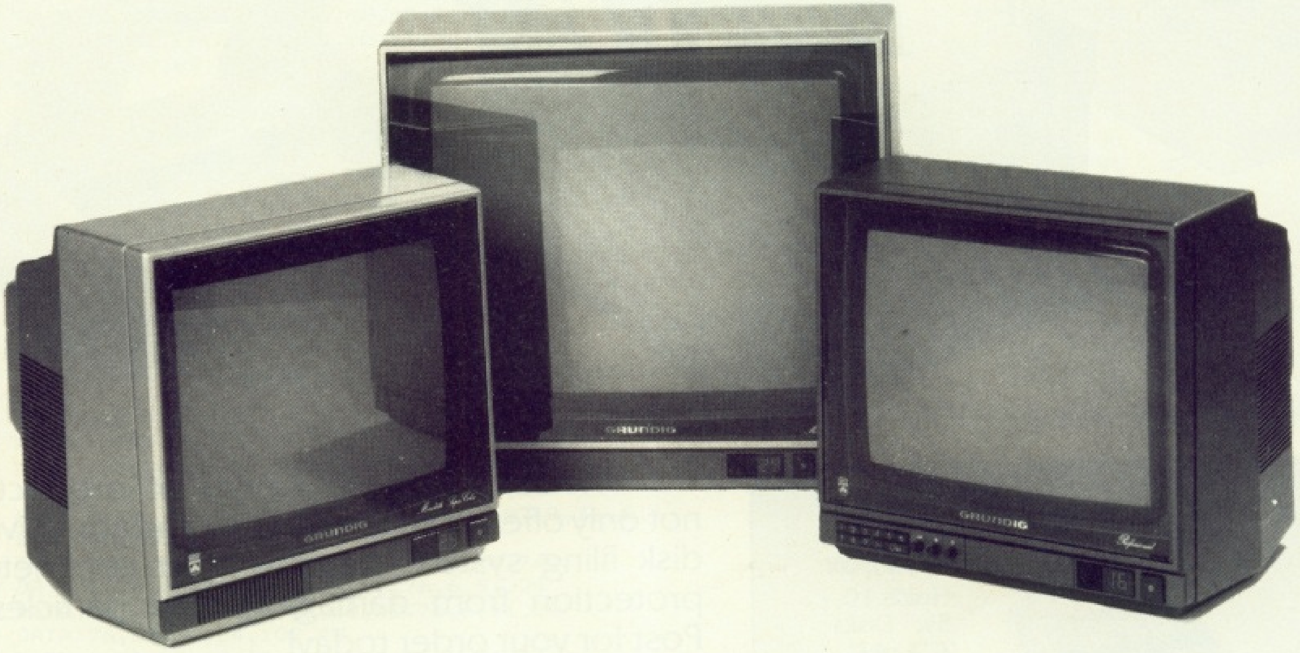
In the picture

As the numbers of computers in the home increases, so does the requirement for a second television, or more likely a monitor. Here we look at a selection of monitors compatible with Commodore computers



Grundig — professional monitor design

Recently the small screen sector has been the largest growing segment of the UK television market. The reason behind this is that the screen is no longer solely used for watching broadcast television or pre-recorded video programmes, but increasingly is used as a display in conjunction with home computers.

Any home with a computer fanatic in its midst will recognise the need for a second or even a third television/monitor. Hardware manufacturers have responded to this demand with a vast selection of monitors to suit your computing needs.

So why choose a monitor as opposed to a conventional television?

There are two ways of producing an on screen display from any computer. Firstly, televisions: by fiddling about with the aerial socket at the back of a conventional TV and tuning a spare channel into the computer.

Secondly, monitors: by a direct means of plugging the computer into the back of the monitor without the drawbacks of tuning the set into the computer.

There may initially seem little difference between these two processes, but if you look closer you will notice that although both of the different types of sets will produce an on-screen display of information, they do it in different ways.

The conventional TV produces its picture by receiving the signals from the computer through its aerial socket using the same system that it uses to receive — produce — broadcast TV pictures. That is, Radio Frequency (RF), ie it uses its own tuner.

Alternatively, monitors produce their pictures using a more direct means. Monitors cut out the tuner section that TVs use to pick up its TV signals, therefore eliminating Radio Frequency interference inherent in this system. The signal from the computer is transferred directly onto the screen.

Home computers also demand a signal bandwidth capable of displaying 80 characters across the width of the screen — more than ordinary TV sets can manage.

The following is a selection of monitors which you can use with a Commodore computer.

THE CUB MONITOR THAT LETS YOU SEE MORE THAN BEFORE . . .

Your Commodore 64 is designed to produce high quality graphics and sound, so why suffer the poor character definition and disappointing colour reception associated with T.V. sets and other monitors. Don't you owe it to yourself to choose a monitor which can display your computer's graphics as they should be – pin sharp, in glowing colour?

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The remarkable CUB/RGB PAL COMPOSITE VIDEO MONITOR not only provides the most brilliant images when used with your Commodore, it also leads a double life, producing the highest quality pictures from LASER DISCS, VCR's and VIDEO CAMERAS. This is because the signal is not modulated and then demodulated, as happens with an ordinary T.V. set.

Add to this an audio facility, 653 pixels (H) screen resolution, full 80 column display capability, plus display of all T.V. channels when used with a VCR and the result is a colour monitor which sounds as good as it looks.

The CUB/RGB PAL COMPOSITE VIDEO MONITOR is also compatible with BBC (A and B), RML 380Z and 480Z, ATARI, ORIC, MSX RANGE, SHARP etc., and is available in a choice of cabinets or with 452 (H) pixels resolution if required.

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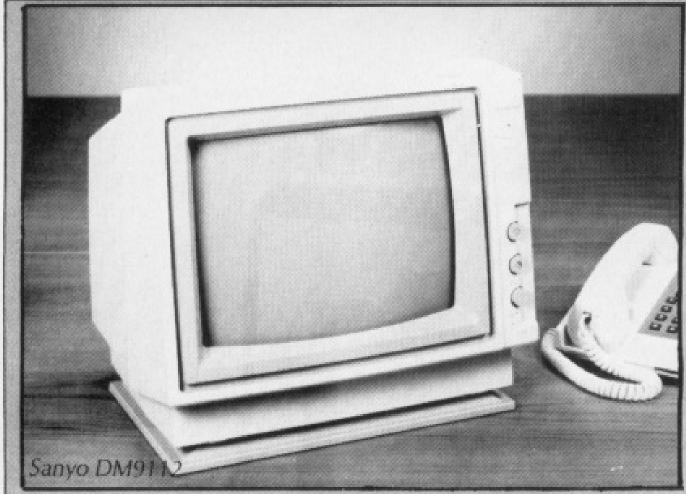


Sanyo DM9112

Sanyo, Otterspool Way, Watford, Herts. Tel: 0923 46363.

DM9112 — 12inch CRT data display monitor

Features: designed for alphanumeric characters and graphics; high resolution display; 80 characters per line, 24 lines per screen in green phosphor on a black background; precision CRT; regulated power supply with isolation transformer; adjustable tilt base.
Price: £119 (ex VAT).

CD3115H — high resolution monitor

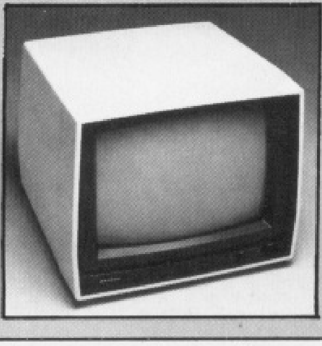
CD3117M — middle resolution monitor

CD3125N — normal resolution monitor

Features: 14inch screens for displaying colour alphanumeric characters and graphics; RGB and VH sync; separate TTL input direct drive system; high resolution — 2,000 characters; middle resolution — 1,500 characters; normal resolution — 1,000 characters.
Prices: £499, £399, £199 respectively (ex VAT).

DM8112 CX — 12T data display monitor

Features: designed for alphanumeric characters and graphics; accepts video signals from computer to display letter, numerals or graphics; high resolution display; 80 characters per line, 24 lines per screen; precision CRT; low geometric distortion; DC restoration circuits.
Price: £109 (ex VAT).



Sanyo DM8112

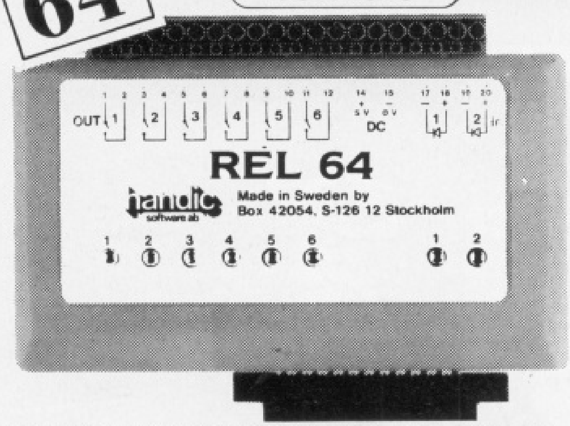
Hantarex, Unit 2, 243 Kangley Bridge Road, Sydenham, London SE26 5BA. Tel: 01-778 1414.

BOXER 12 — 12inch monochrome monitor

Features: high resolution; composite video input; 80 characters per line, 25 lines per screen; screen treatment; dark glass; phosphor P31 — green medium-short.
Price: £86.52 (ex VAT).

CT 900/1 SR — 14inch colour monitor

Features: PAL-CCIR with Sound; RGB Linear, TTL compatible; 40 characters per line, 25 lines per screen.
Price: £258 (ex VAT).



REL 64

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Relay Cartridge for CBM 64 and VIC 20

Have you ever thought "Why can't I use the 64 to control the lights while I'm on holiday?". Now you can. You provide the software in the shape of a little program that controls the relays provided by REL 64 cartridge.

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34.95 inc. VAT

SUPER BOX 64

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IEEE SLOT 3 SLOT 2 SLOT 1 RESET
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IEEE CONNECTOR

Expansion unit for the CBM 64

Are you tired of changing cartridges all the time, wearing out the cartridge slot?

Would you like to be able to use a letter quality printer with your 64? Or hook up several 64s to the same double disk drive? Then take a look at the SUPER BOX 64.

- Three independent cartridge slots
- IEEE interface that is totally transparent
- Multi-user capabilities with IEEE
- Reset switch – activating a cold start of the computer

With the SUPER BOX 64 it is possible to connect up to three cartridges at once. It makes frequent alternating between programs simple and reduces wear on the cartridge slot.

The reset function allows you to cold start the computer without loosing the contents in RAM.

The built-in, totally transparent (i.e. does not occupy the computer's internal memory) IEEE interface enables you to run one or two IEEE units with any chosen program. For example, a letter type printer with word processing or Calc Result, or in laboratories using testing equipment of IEEE 488 standard. SUPER BOX 64 also enables you to create a multi-user system of up to four CBM 64s.

67.87 inc. VAT

Ferguson, Cambridge House, Great Cambridge Road, Enfield, Middx EN1 1UL. Tel: 01-363 5353.

MM02 and MM06 — 12 inch monochrome monitors

Features: green or amber phosphor cathode ray tubes for clear character display; anti-glare face plate; dynamic focus; range of sync inputs for user flexibility; both linear and TTL input signals are acceptable and from a linear input they are capable of producing a shaded display; 80 characters per row and 25 rows per screen; fast line flyback to display up to 100 characters per row.

Price: approx £80.

Ferguson MM02

Ferguson MC01

MC01 — 14inch TX monitor colour television

Features: RGB and sync input socket with sound; composite video input socket with sound; electronic signal routing to enable home computer, video etc to be permanently connected; automatic sensing of sync polarity on RGB; linear or TTL input signals; pre-set adjustable gain control on composite video input to achieve best possible performance under different levels of incoming signal; special leads available to connect most makes of home computer.

Price: £225.

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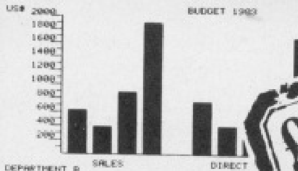

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Tel: 0536 205555

1701 — 14INCH COLOUR MONITOR

(1702 is a more recent model, but features are the same)
Features: high quality high resolution; 40 characters per line, 25 lines per screen; composite video signal; Commodore video input.
Price: £230.

Grundig, Mill Road, Rugby, Warwickshire CV21 1PR. Tel: 0788 77155.

P40 145 — monitor styling with FST

Features: teletext convertible set; 36cm Flat Square Tube (FST) and tinted glass screen for sharper text images; RGB/composite video/audio input.
Price: £299.95.

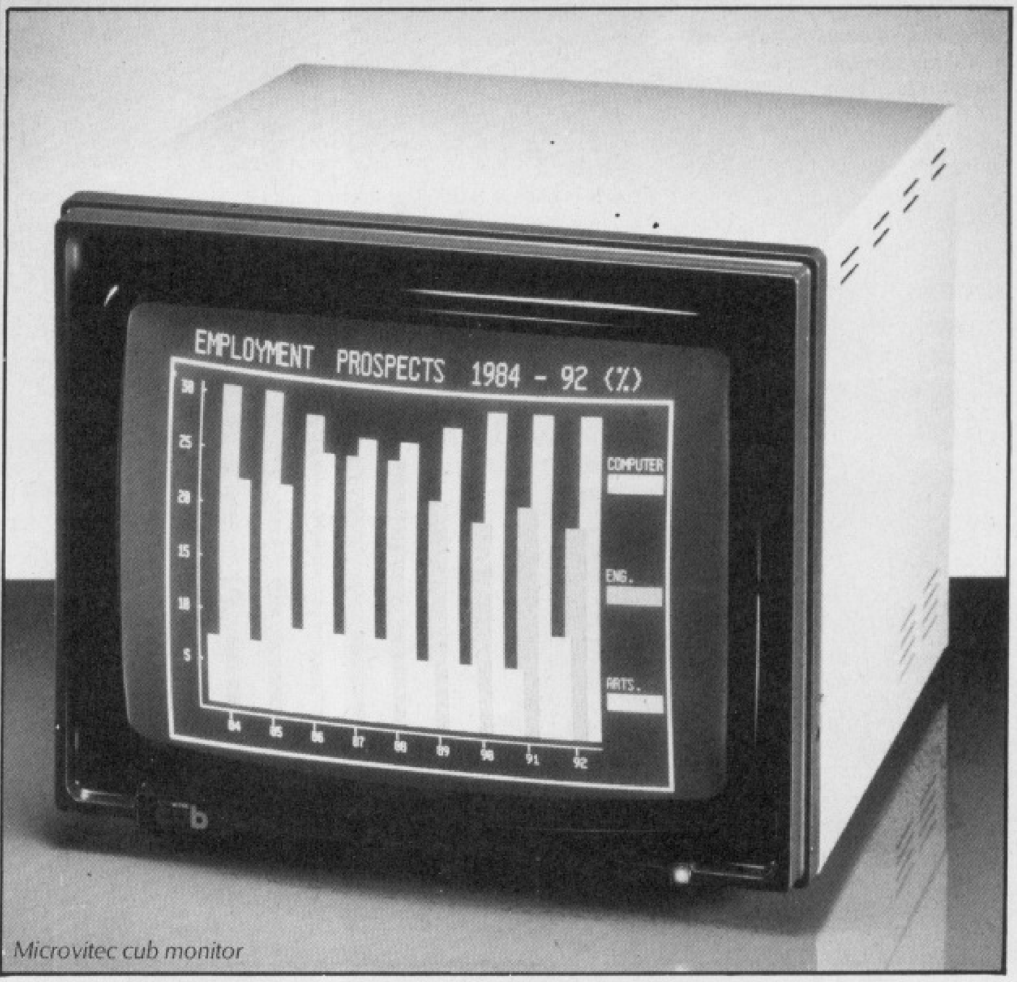
P55 145

Features: 51cm Flat Screen Tube and tinted glass screen; RGB/composite video/audio input.
Price: £349.95.

Sony, Communications Systems Division, Sony House, South Street, Staines, Middx. TW18 4PF. Tel: Staines 61688.

Trinitron 13inch four-colour monitor

Features: high resolution 'super fine pitch'; PAL, SECAM, NTSC colour system selected automatically; line A, line B, VTR, RGB and Computer input selector; 2,000 character display; built-in IBM PC interface; accepts an external sync.
Price: £889.



Microvitec cub monitor

Microvitec, Futures Way, Bolling Road, Bradford, West Yorkshire BD4 7TU. Tel: 0274 390011.

1431 AP — 14inch CUB monitor from

452 range

Features: RGB/PAL inputs; standard resolution; low complexity colour display; high quality colour resolution; approved by BEAB and GLC.
Price: £259.

2030 AP — 20 inch CUB monitor

Features: RGB/PAL inputs; available in standard and high resolution; high resolution graphics capability.
Price: £445.

Philips, PO Box 298, City House, 420-430 London Road, Croydon CR9 3QR. Tel: 01-689 2166.

BM 7513 — 12inch green screen monitor (compatible with Commodore's new PC)

Features: high resolution CRT anti-glare treated, dark glass; TTL input connection; 2,000 character display; adjustable viewing angle; interface cable included.
Price: £115.

BM 7502 — 12inch dedicated green screen monitor

Features: high resolution CRT anti-glare treated, dark glass; P31 green phosphor; CVBS input connection; audio input connection; 2,000 character display; adjustable viewing angle.
Price: £80.

BM 7522 — 12 inch dedicated amber screen monitor

Features: high resolution CRT anti-glare treated, dark glass; LA amber phosphor; CVBS input connection; audio input connection; 2,000 character display; adjustable viewing angle.
Price: £85.

CT 2007 — all in one colour monitor

Features: normal television reception plus choice of inputs — RF, CVBS, RGB; headphone with loudspeaker mute switch and loop aerial; independent volume control for computer sound input.
Price: £239.

VIZASTAR 64

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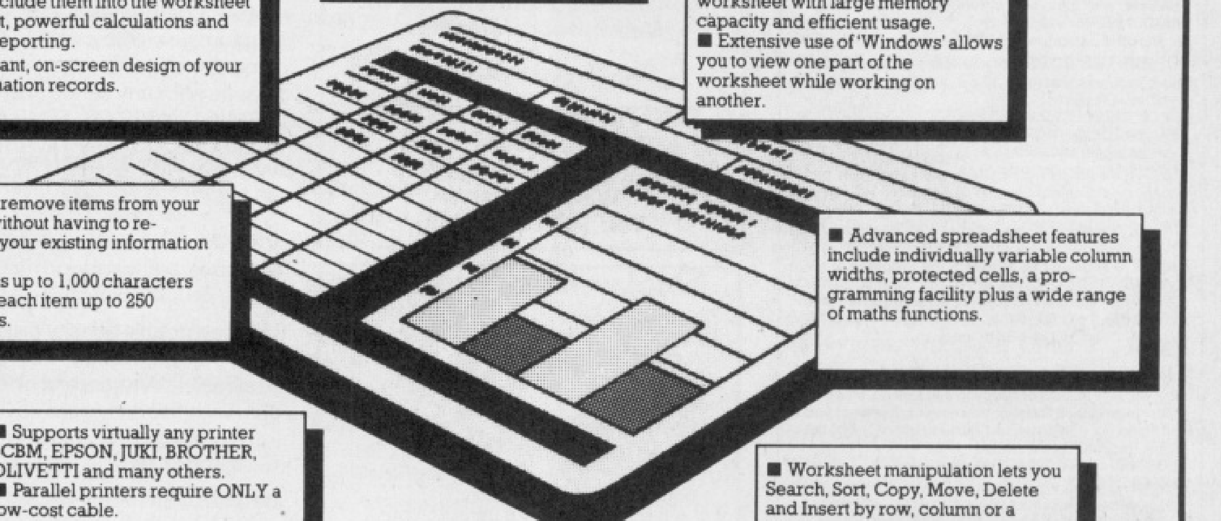
■ Spreadsheet ■ Database ■ Graphics



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■ Instant, on-screen design of your information records.

■ A 1000 Row by 64 Column wide worksheet with large memory capacity and efficient usage.
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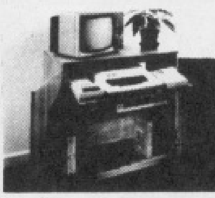

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CBM 64 Busicalc tape and manual £8, Dictionary of Computing £6. Games tape with 25 programs + listings £4+ various games £2 each. Tel: 061-434-2375 after 5pm.

CBM 64 owner wishes to swap software (tape only). Large collection of English and American software. Send you list for mine by return. All letters answered. G. Kenny, 28 Wordsworth Avenue, Hartlepool, Cleveland.

Danish CBM 64 user with 300-400 programs would like to swap. Only disk. Send list to: Torben Overgaard, Silkeborgvej 34, 7400 Herning, Denmark.

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C64 software to exchange. All disk based. Send list to Jurgen Reiners, Elsa-Brandström — Strasse 2, 2190 Cuxhaven, W. Germany.

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CBM 64 I would like to buy software — games and educational (tape only). Please send detaislt o P.R. Green, 22 Ashford Close, Mannamead, Plymouth, PL3 5AG Devon England.

Commodore 64 owner wants to swap C-64 games. I've got plenty of them, even very famous ones. Send list to H. Vierhoven, Vd D.V. Maasdamstraat 33, 6741 WL Lunteren (Holland).

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Irish CBM 64 owner would like to swap games (Tape only) can convert all games to turbo. Loads as quick as disk. Send to Ronan O'Conner, Rockwell College, Cashel, Co. Tipperary Ireland.

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Wanted can anyone help with copy of instruction leaflet for Rabbit Softwares "Graphic Editor" thanks. Page "The Corniel" Bayr Grianagh. Castletown. Isle of Man.

Wanted — Commodore 8096 or 8096 SK and 8050 disk drive with software if possible. Phone Hagley 883649 or 021-747 8784.

C64 software to swap. Many good games, have over 400 programs. All tape based. Erik Langendoen, Hugevliet Straats, 4521AV. Biervleit, The Netherlands. And I still get more programs.

CBM 64 programs swapped, also details of other interesting items for sale for CBM 64. Too many to list, Wigan 225029 or 493460 pm. 7 Denham Drive, Marcus Bridge, Wigan , Lancs.

Radio Ham International Jumbo AM/FM/SSB 360CH with many extras fitted. Sell for £150 or trade for MPS801 printer. For full spec. contact Taff Hutchings PO BOX 48, Derby DE6 6QP. Radio related programs also wanted please.

Finnish c64 and PET 4032 user would like to swap or buy disk software. Please send list to Peter Abbott, PO Box 47 02661 Espoo 66, Finland.

VIC 20 8K RAM pack & data sette and software and software book £160 o.n.o. Incl. p&p. Please write to P Cambiottis, Amsterdijk — Zuid 160. nes A/D Amstel 1189 VM Holland.

VIC 20 software for sale or swap. 150 titles. For program list send S.A.E. to Ray, 48 Simonside Terrace, Heaton Newcastle upon Tyne, Tyne and Wear, NE6 5JY England.

Attention all CBM 64 owners!!! I am interested in trading ideas, advice, tips, and most of all software with anyone, anywhere. I have 500 plus games and utilities from U.S.A. and Europe. Send list of software to: Todd Clarke, 6413 Cranbrooke N.E., Albuguerque, New Mexico, 87111, USA.

CBM 64 I would like to swap or buy turbo loading games (tape only). I have Boulderdash, Jinn Genie, Encounter, Her o and many others. Nick Birds, Shawcroft Biggin Hartington Buxton. Derbyshire SK17 0DH England.

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U.S.A. C-64 user group would like to exchange software and ideas with European groups or individuals. Prefer disk, but will consider tape. Respone to: Metro-Area Commodore Club, Box M, Mendata, Minnesota. 55150 — U.S.A. or call (612) 778-8188.

CBM 64 games for sale. 120 games for sale. Send name and address + 50p for list to Jon Chr. Moller. Mosebk 8. 8250 Rognan, Norway.

C64 user wishes to contact other 64 users. We have many software. Over 1000 titles. To order list, contact: An Kennwort Petra Postlagernd 4300 Essen W. Germany.

Printer MPS801 for CBM 64/20. Used two months only, under guarantee £150 o.n.o. Easy Script word processor, original £15. Petspeed 64 Basic compiler, original £20. Phone 0304-813098 (Dover) for details.

64 Original software, 45 titles including Loco, Decathlon, beach Head, Zim Dala Bim. Cost £300+, Sell £100 or swap disk drive or printer, Walton 70 Maple Crescent, Newbury Berks.

Hello C-64 user! Do you want software? We have lots of programs and they're cheaper than anywhere (£2 each) Large info: Postlagernd, Kennwort: "Why not" 4300 Essen N W. Germany.

For sale Maplin modem built and tested. Kit plus RS232 interface cost £65. Unused. What offers? Tel: 0376-516335 Allan Potter 14 Foxmead, Rivenhall End. Witham, Essex CM8 3HD.

Colchester Computer Society welcomes all Commodore 64 owners meeting hald every first and third Wednesday at 7.30 pm at Severall's Hosatal Social Club, Mill Lane, Colchester. Turn up or ring 0276-516335.

CBM 64 user in Denmark wishes to exchange game and utility programs. (More than 800 titles) Send list to Peter Klein, Meteorvej 15, 2730 Herlev, Denmark.

CBM 64 user wants to swap programs. Have about 250 programs. Cassette only. Send you list to: Thor Ove Fivelstad, Box 206 6010. Spjelkavik, Norway.

CBM 64 Lemans, Flight 737, Spitfire Ace, Space Pilot, Zaxxon, Moon Buggy, many more plus Quick Shot 1+2 joystick. Swap for disk games or £45 the lot. Ring 301-0904 eves.

CBM 64 programs Easyscript — new unused £20.00 o.n.o. Future finance — used once. £15.00 o.n.o. Wanted plans for 1701 monitor T.V. Tuner (or stockists name) Nick 07919-63054 or Blandford Board.

64 owner wishes to swap games and ideas — disc only. Send lists to John, 11 Rosslyn Avenue, Dagenham, Essex RM8 1JR.

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Dutch CBM 64 owner wishes to swap software on tape. I have got an awful lot of titles so send your list to lex van Dam Sydwende, 32 9204KE Drachten, The Netherlands.

Looking for persons with which to swap programs and tips (for teh C-64) I have many great titles. Please send lists to: C. Cliffe, 17 Rugby Road, Lutterworth. Leics (120 + programs).

Commodore 64 owner wishes to swap software on tape. Please send list and S.A.E. to Robert Truscott, 25 Hereward Way, Weeting, Brandon, Suffolk IP27 0QN or phone 0842-810188.

Easyscript for CBM 64. Came free with 1541 disc. Retail £75. Offers around £50. Tel: evenings (051) 430-7408.

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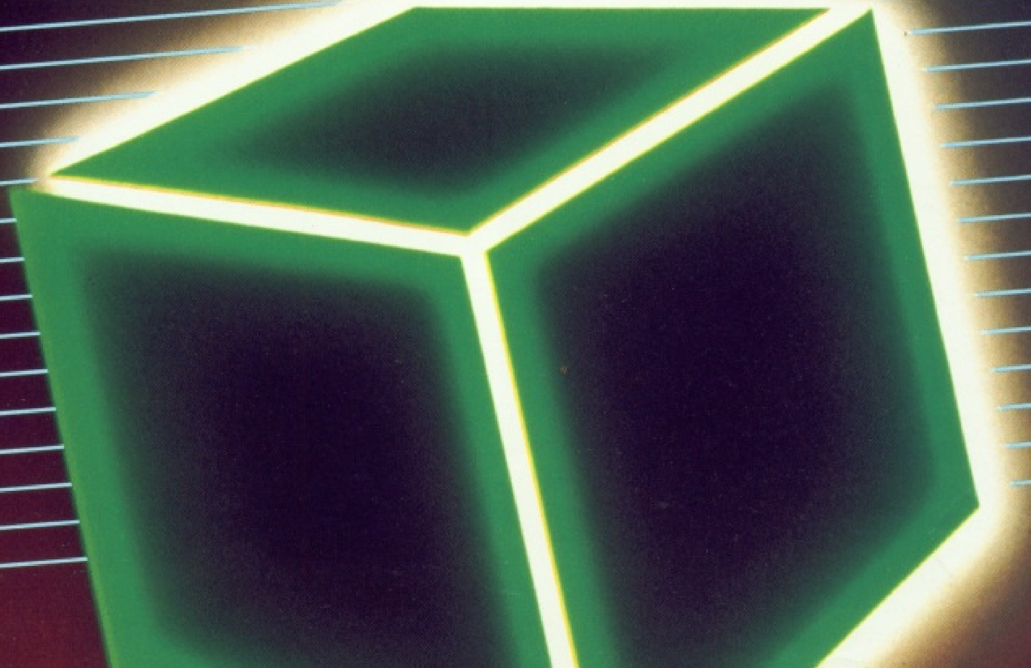

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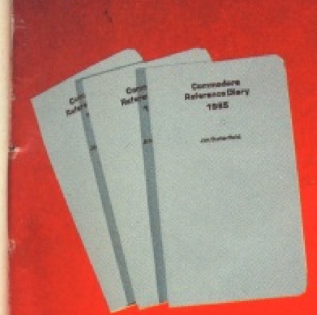

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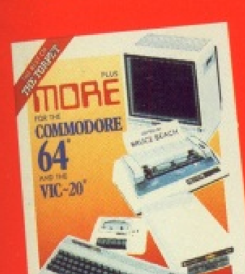

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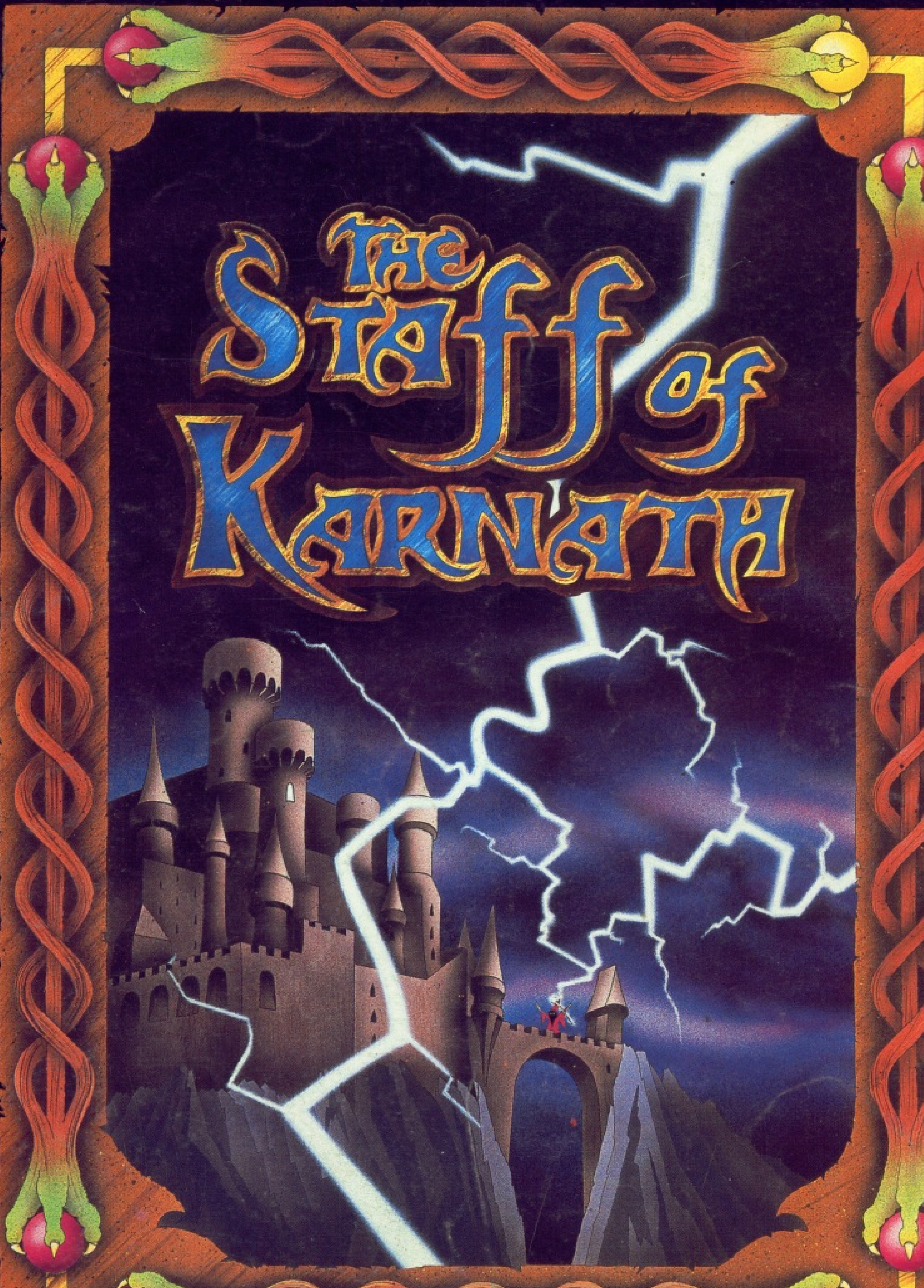

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